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## Do acceptance and cognitive representations of pain predict engagement and outcome on a pain management programme?

### Thesis

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HILARY RANKIN BSc Jt Hons MSc

DO ACCEPTANCE AND COGNITIVE REPRESENTATIONS  
OF PAIN PREDICT ENGAGEMENT AND OUTCOME ON  
A PAIN MANAGEMENT PROGRAMME?

A thesis submitted in partial fulfillment of the requirements of the Open  
University for the degree of Doctor of Clinical Psychology

SEPTEMBER 2001

SALOMONS  
CANTERBURY CHRIST CHURCH UNIVERSITY COLLEGE

AWARD DATE: 27 JUNE 2001

**DECLARATION**

This work has not previously been accepted in any substance for any degree and is not being concurrently submitted in candidature for any degree.

Signed .....HAU..... (Candidate)

Date .....10/10/01.....

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Signed .....S.E. Holtum..... (Supervisor)

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## **Acknowledgements**

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## **Abstract**

### **Background and aims**

Pain management programmes provide effective interventions for people with chronic pain, but effects are modest, and not all participants benefit. The current study aims to investigate the role of acceptance and cognitive representations i.e. beliefs about pain, in engagement, and outcome, of this kind of intervention.

### **Design and participants**

A quantitative design was used to investigate whether acceptance and cognitive representations of pain predict engagement and outcome of intervention, whether acceptance and cognitive representations change during intervention, and the relationship of acceptance with five dimensions of belief. Participants were 116 patients referred for assessment to a pain management programme.

### **Measures**

Questionnaire measures of acceptance of pain, and cognitive representations of pain were used as predictor variables. Measures of distress, self-efficacy and physical function were used as outcome measures. Pain severity and waiting time were also measured as potentially confounding variables.

### **Results**

Measures of acceptance and cognitive representations of pain did not predict who would complete the intervention. Increases in acceptance, and decreases in perceived consequences of pain, and pain identity, occurred during the intervention. Lower

acceptance was related to more serious perceived consequences and greater pain identity, but not with beliefs about cause or expected duration of pain, or beliefs in control and cure.

### **Implications**

Interventions aiming to increase acceptance by changing beliefs about perceived consequences of pain and pain identity may be useful. Further research is needed to explore the nature of acceptance, and the role of different dimensions of belief in affecting functioning, in chronic pain populations.

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# **Chapter 1**

## **Introduction**

Pain management programmes provide interventions for people with chronic pain for whom there is no known medical cure. Research and theory suggest that acceptance and cognitive representations of pain may play a role in the outcome of these interventions, but more needs to be known. In order to explore current knowledge and theory on the role of these factors, consideration will be given to the nature of the presenting problem, the theoretical basis and nature of intervention programmes, and the reasons why acceptance and cognitive representations seem to be useful concepts to investigate.

### **1.1 The nature of chronic pain**

The concept of chronic pain as being different and distinct from acute pain is relatively recent and stems primarily from research in the nineteen sixties and seventies into the nature of pain. A practical working definition of chronic pain is any pain which lasts for six months or more (Williams & Erskine, 1995). Williams & Erskine summarize additional concomitants of chronic pain which distinguish it from acute pain, including a high degree of suffering, adverse effects on family relationships, economic costs through loss of work, and high demands on health care services.

## **1.2 The development of cognitive-behavioural theories of pain**

Prior to 1965, the dominant model of pain was based on Cartesian explanations of physical functioning, whereby pain is seen as a function of a specific disordered pathology which will cease when the pathology is removed or corrected (Gatchel, 1999). The inadequacy of this model to explain major variations in pain levels in seemingly similar pathologies was brought into focus when Beecher (1956, cited in Gatchel, 1999) documented unusually low levels of pain report in wounded soldiers in World War Two, in striking contrast to civilians with similar injuries. Since then, two strands of research and theoretical development have produced major challenges to the biomedical model and illustrated the importance of psychological factors in influencing pain experience and management.

The groundbreaking Gate Theory of Pain Control, first put forward in 1965 by Melzack and Wall (reported in Melzack & Wall, 1982) proposed an alternative model which sought to explain the failures and variations in outcome of traditional medical techniques. It is known that in the dorsal branches of the spinal cord, peripheral nerves transmitting pain messages meet up with nerves which ascend to the brain. Gate Theory proposes that the synapse at this site acts like a “gate” which can allow more or fewer pain messages through, and thus modulate the experience of pain. The gate can be affected not only by the amount of peripheral nerve stimulation, but by the influence of other types of nerve such as those transmitting touch sensations and, more significantly, descending nerves from the brain. The model has been extremely influential. Most importantly, it opens up the possibility that central processing and psychological factors can influence the experience of pain through the influence of

descending pathways from the brain, and allows for the development of psychological theory in this area. It has been further refined and developed over the intervening years and is still widely accepted as a useful working model of pain (Wall, 1996).

A second highly influential strand of research came from the application of behavioural theory to the understanding of pain. Fordyce (1976) introduced the concept of “pain behaviour” as being an important dimension of pain, which can be distinguished from the subjective experience of pain, and to which hitherto little attention had been paid. Unlike the subjective experience of pain, which can only be measured indirectly by self-report, pain behaviours are observable and measurable phenomena. This focus on overt behaviours lent itself to empirical investigation of the effect of reinforcement contingencies on pain behaviours as diverse as verbal expressions of pain, grimacing or limping, the use of physical aids such as sticks, and seeking health care. Both laboratory and clinical studies provided evidence that pain behaviours can be increased or decreased as a result of changing reinforcement contingencies (Fordyce, 1976). Fordyce’s theory offered a behavioural explanation for the development of the observable manifestations of chronic pain, through the reinforcement of behaviours incompatible with recovery, such as prolonged rest, avoidance of painful activity and over-reliance on medical interventions and health care usage as a coping strategy. Later studies confirmed the key role of avoidance of painful activity in the development of chronic pain and disability (Philips, 1987).

As behavioural theories have become more sophisticated, the role of cognitions in shaping pain behaviour and experience has been increasingly recognized and investigated. Important constructs which have been identified as affecting pain

tolerance and functional ability, include the use of cognitive coping strategies (Turner & Clancy, 1986), negative cognitions such as catastrophizing (Turk & Rudy, 1992), attributions and beliefs about the nature of the pain (Williams & Keefe, 1991), self-efficacy (Dolce, 1987) and the perception of fault or blame (DeGood & Kiernan, 1996). Rudy, Kerns & Turk (1988) further provided evidence, through the use of structural modelling techniques, for the mediating role of perceptions of lack of control and personal mastery in the development of depression in chronic pain. Further research into avoidance behaviour has suggested that the underlying belief that pain will lead to further damage is crucial in engendering avoidance of painful activity, and thereby, disability and distress (Asmundsen, Norton & Norton, 1999; Vlaeyen & Linton, 2000).

Some recent studies have explored the relationship between some of these factors, such as the investigation by Stroud, Thorn, Jensen & Boothby (2000) into the relationship between pain beliefs, negative thoughts and psychosocial functioning. There has, however, been a paucity of research within the study of chronic pain which investigates the relationship between the range of above-mentioned cognitive concepts in a systematic way. In a review of studies into cognitive representations in chronic somatic illnesses, Scharloo & Kaptein (1997) reported forty-six studies of chronic pain, all of which studied only one or two dimensions of cognition. Despite this need for further research into the relationship between cognitive factors, there is, however, widespread acceptance of the relevance of cognitions to the experience and management of chronic pain (Turk, 1996).

There has also been increasing recognition of the role of social factors in the

development of chronic pain (Skevington, 1996). For example, dissatisfaction with work has been found to be associated with increased report of back pain (Bigos, Battie, Spengler, Fisher, Fordyce, Hansson, Nachemson & Wortley, 1991). Also, there is a growing body of work suggesting that the family may play an important role in promoting or hindering adaptive behaviour in chronic pain (Kerns, 1999).

Bringing together the findings of these areas of research, there is considerable consensus that a so-called biopsychosocial model of chronic pain is the most appropriate framework for understanding and treating the problem (Turk & Flor, 1999). However, there has been some recent criticism concerning methodological limitations of this model. Crossley (2000) comments on the way in which different strands of research are “thrown together in a seemingly fragmented way with little theoretical understanding of how they actually fit together”. Some authors have attempted to articulate a cohesive model. Skevington (1996) outlined a proposed model of the psychological processes and social factors implicated in the generation and maintenance of chronic pain, which incorporates over thirty factors at four different levels. These range from individual behaviours through interpersonal behaviours and group or intergroup behaviour, to higher order factors such as health culture, politics and ideology. This provides an indication of the complexity of the pain experience and the difficulty in identifying and selecting specific cognitions and behaviours for intervention.

## **1.2 Effects of cognitive-behavioural theories of pain on clinical practice**

One of the most important effects of the work of Melzack & Wall (1982), and



Fordyce (1976), was to legitimize the treatment of pain itself rather than seeing it as a secondary problem to be cured by treating an underlying physical condition.

Within medical practice a wide variety of treatments has been developed which aim to block transmission of pain messages at the “gate”. These include the use of opiate based analgesic drugs, acupuncture, electrical machines which stimulate the nerves transmitting touch sensations, and injections of analgesic drugs into the epidural space in the spinal column. However, there has been a lack of consistent evidence of significant long-term benefit of many of these commonly used medical interventions for people with chronic pain (Koes, Scholten, Mens & Bouter, 1995; McQuay & Moore, 1998).

Fordyce’s behavioural work implies that this failure may be in part related to the need to address behavioural aspects of pain, and the potentially reinforcing effects of medical intervention aimed at short-term relief or cure. This has been echoed by influential voices from within the medical profession, who have questioned the value of offering treatments which, at best, show limited evidence of only short term relief for essentially incurable, long-term conditions such as low back pain (Waddell, 1996; Loeser & Sullivan, 1995). Behavioural theory led to the development of alternative intervention strategies aimed at altering reinforcement contingencies to promote behaviour likely to lead to improved physical function. Examples include graded exposure to activities avoided due to pain, such as exercise and everyday tasks, and use of analgesic medication on a time-contingent, rather than a pain-contingent basis, to eliminate its reinforcing properties and prevent overdependence on its use as a coping strategy.

With the increasing emphasis on the role of cognitions in influencing behaviour came reports of a range of cognitive behavioural interventions aimed at improving physical function and reducing the distress associated with chronic pain (Turk, Meichenbaum & Genest, 1983). Interventions typically aim to modify conceptualizations of pain and train participants in a variety of techniques such as relaxation, progressive goal setting and challenging maladaptive cognitions and beliefs in order to increase the ability to cope with pain. Success has been reported with a wide range of painful conditions, both those with clearly identified physical pathology such as rheumatoid arthritis (Keefe & Van Horn, 1993), and those without clear associated pathology such as low back pain (Turner & Jensen, 1993; Van Tulder, Ostelo, Vlaeyen, Linton, Morley & Assendelft, 2000), headache (Holroyd & Lipchik, 1999), fibromyalgia (White & Nielson, 1995) and temporomandibular pain (Dworkin, 1999). A recent systematic review and meta-analysis of cognitive therapy for chronic pain, excluding headache, concluded that there is convincing evidence for diverse effects, including improvements in mood, reported pain, physical function, greater frequency of return to work, and reductions in use of the health care system (Morley, Eccleston & Williams, 1999).

#### **1.4 The development of pain management programmes**

Pain management programmes have developed in the U.K. since 1983 when the first programme was established in Liverpool (Main & Spanswick, 2000), following early reports of success of the approach in the U.S.A. (e.g. Roberts & Reinhardt, 1980; Chapman, Brena & Bradford, 1981). They provide a practical tool to bring together

the combined expertise of a range of health professionals in providing a range of interventions within a cognitive behavioural framework. This kind of multidisciplinary approach is recommended by government-sponsored bodies in the U.K. for people with chronic pain problems (Clinical Standards Advisory Group, 1994; NHS Centre for Reviews and Dissemination, 2000).

Programmes aim to improve function and reduce distress in patients presenting with chronic pain. Professions typically involved include clinical psychology, physiotherapy, medicine, nursing and occupational therapy. Although it is unclear exactly which components of such programmes are effective in producing desirable changes, multi-component therapies have been found to be more effective than single-component therapies (Pfingsten, Hildebrandt, Leibing, Franz & Saur, 1997). Guidelines in the U. K., therefore, emphasize the need for inclusion of a variety of intervention strategies (Hill, 1995; The Pain Society, 1997). These include physical reconditioning (i.e. improving muscular strength and flexibility through exercises), posture and body mechanics training, applied relaxation techniques, information and education about pain and pain management, medication review and advice, cognitive restructuring, and graded return to activities of daily life. Programmes are usually run on a group basis, both for cost-effective reasons and to harness therapeutic effects of the group, such as observational learning, peer reinforcement and enhancing universality i.e. a sense of not being alone (Williams & Erskine, 1995).

Again, there has been widespread report of the effectiveness of multidisciplinary pain management interventions in producing behavioural and emotional change, both those which focus intervention on a single clinical group, most frequently low back pain

(e.g. Turner & Jensen, 1993, Pfingsten et. al., 1997), and those which include pain of different sites, associated with different diagnoses (e.g. Guck, Skultety, Meilman & Dowd, 1985; Williams, Nichols, Richardson, Pither, Justins, Chamberlain, Harding, Ralphs, Jones, Dieudonne, Featherstone, Hodgson, Ridout & Shannon, 1993). A meta-analysis of sixty five studies of these kinds of interventions concluded that they were efficacious overall, although many studies were criticized for methodological weaknesses such as lack of appropriate control groups and high rates of drop-out at follow-up (Flor, Fydrich & Turk, 1992).

A number of studies have demonstrated associated changes in cognitive constructs such as catastrophising (Pfingsten et al., 1997) and self-efficacy beliefs (Williams et al., 1993). Jensen, Turner & Romano (1994) found that improved functioning and decreased use of health care were associated with changes in both beliefs and cognitive coping strategies. Although the nature of the process of change is not well understood on pain management programmes, it has increasingly been suggested that a crucial factor is the change in relevant beliefs (Jensen, Romano, Turner, Good & Wald, 1999).

### **1.5 Limitations of the pain management programme approach**

In spite of the large body of literature supporting the efficacy of cognitive behavioural approaches in the treatment of chronic pain, some cautionary notes have been voiced. Turk (1990) commented on the absence of empirical data linking patient characteristics with outcome. A review of outcome studies of these kinds of intervention in the United States of America noted that outcome is usually based on

comparison of group means and that not all participants benefit from the approach (Turk & Rudy, 1991). Studies have been criticized for omitting details of drop-out rates and for basing evaluation of success only on those who complete treatment (Turk, Rudy & Sorkin, 1993). In addition, in a recent systematic review of outcome studies, the degree of improvement in physical and psychological function for those completing interventions was described by the review authors as “small and modest” (Van Tulder et. al., 2000).

If the needs of people with chronic pain are to be addressed in the most effective way it is important to understand why some people gain more benefit than others. One study (Coughlan, Ridout, Williams & Richardson, 1995), exploring this area, found that drop-out was best predicted by low self-efficacy beliefs and poor physical performance, suggesting that cognitive as well as physical factors may be significant in determining who engages with, and benefits from, treatment. In addition, the authors found that the frequency of catastrophic thoughts at one-month follow-up was the best predictor of non-attendance at six-month follow-up. The study by Coughlan et. al. (1995) provides an example of how an understanding of the psychological processes underlying differences in improvement in physical and psychological function could help to refine interventions to achieve maximum benefit to those who participate. It may also help to improve understanding of why some participants fail to benefit, and could aid consideration of how the needs of people who may not gain from current pain management approaches can best be met. This is important in a field where current approaches have been criticized for not being based on a sound theoretical understanding of underlying psychological processes (Weinman & Petrie, 1997a).

A further psychological concept, which may be of key importance in determining who benefits from pain management programmes, is that of acceptance. Acceptance in chronic pain has received recent research attention, which will be discussed after first defining acceptance.

## **1.6 What is acceptance?**

In the author's clinical experience, many patients, when asked how they have benefited from a pain management programme, will describe increased acceptance as a key factor underlying changes in attitude and behaviour. However, the concept of acceptance, whilst implicit in many debates about the management of chronic pain, has not been explicitly addressed in the field until recently. This may in part be due to the difficulty in defining the meaning of acceptance. At a conference on acceptance and change in psychotherapy in 1993, there was widespread agreement that acceptance is an important and necessary step in the process of change (Hayes, Jacobson, Follette & Dougher, 1994). However, it was also acknowledged that the concept of acceptance, whilst making intuitive sense to clinicians, is much harder to define in a way which can be explored in clinical research (Haas, 1994).

In the pain management field, the first published study to the author's knowledge which explicitly considers the concept of acceptance in relation to adjustment to and coping with pain was presented by McCracken in 1998 (McCracken, 1998a). McCracken's conceptualization of acceptance is grounded in behavioural theory and has evolved from earlier work exploring the role of anxiety and fear of pain on avoidance behaviour (McCracken, Gross, Sorg & Edmands, 1993). He defines

acceptance as acknowledging that one has pain, giving up unproductive efforts to control pain, acting as if pain does not necessarily imply disability, and being able to commit one's efforts towards living a satisfying life despite pain.

This definition focuses on the behavioural concomitants of acceptance. In the author's clinical experience, and that of other clinicians in the field (e.g. Jackson, 1999), however, another important concept is that of acceptance of losses associated with pain, such as loss of valued physical abilities and activities, and loss of the ability to act spontaneously. Studies in the field of disability and chronic illness have conceptualized acceptance as acceptance of loss, and appear to have relevance to chronic pain patients, the majority of whom continue to experience pain and physical limitation, even after pain management programme interventions (Maruta, Malinchoc, Offord & Colligan, 1998). Thus acceptance of a degree of continued disability is likely to be a key factor in adjustment.

Dembo, Leviton & Wright (1956) defined acceptance of disability as acceptance of loss and a process of value changes. Later studies based on the work of Dembo et. al. have defined four dimensions of acceptance, which have been used to develop questionnaire measures of acceptance (Linkowski, 1971; Li & Moore, 1998). These dimensions are the extent to which the person:-

- recognizes values other than those which are in direct conflict with the disability
- focuses most on those aspects of life which are not affected by the disability
- does not extend his/her handicap beyond actual physical impairment to other aspects of the functioning self

- compares himself/herself to others in areas of assets rather than limitations

This definition of acceptance clearly differs from McCracken's emphasis on behavioural aspects of acceptance, focusing instead on the cognitive and emotional concomitants of loss. However, there are similarities between the concepts, with both incorporating the notion of not extending disability beyond actual physical limitation and focussing attention or effort on aspects of life which result in satisfaction or greater appraisal of self-value. These reports from two separate fields of research suggest that there is some commonality to definitions of the meaning of acceptance, but that further work exploring these notions is needed.

For example, the relationship of control to acceptance is far from clear. Giving up unproductive attempts to control pain is an explicit element of McCracken's definition of pain. However, implicit in both models is that attentional control i.e. focussing on valued aspects of the self or on attempts to control other aspects of the situation may be key components of acceptance. Indeed, McCracken acknowledges that interventions aimed at improving control over pain have resulted in increases on a questionnaire measure of acceptance of pain (Geiser, 1992, cited in McCracken, 1998a). The concept of control itself may need clearer definition in order to investigate and reach a better understanding of its relationship with acceptance. As with acceptance, control is a concept widely used in everyday life, but when applied to the management of pain could have many different meanings. McCracken's concept of control is closely linked to avoidance or attempts to reduce pain, which has emerged as a key factor in the maintenance of chronic pain and disability (Vlaeyen & Linton, 2000). However, control could also be construed to mean the regulation or



management of pain so that it stays at a relatively stable level. This concept has been widely endorsed as a strategy associated with improved coping of chronic pain (Haythornthwaite, Menefee, Heinberg & Clark, 1998) and might be expected to be associated with greater acceptance.

### **1.7 Evidence for the role of acceptance in chronic pain**

Although the concept of acceptance has not been explicitly defined in relation to chronic pain until recently, notions of acceptance are implicit in much research and debate in the field. Debate about the value of medical interventions aimed at pain relief (i.e. medical control) versus cognitive behavioural interventions aimed at pain management, implies that acceptance of continuing pain may be a necessary precursor to successful adaptation in those for whom there is no known medical cure (e.g. Waddell, 1996). Waddell expressed the opinion that the medicalization of chronic back pain has not only been of no help to people experiencing it, but has actually been harmful by perpetuating unrealistic expectations of relief and cure. Concerns have been expressed that such expectations are embedded in Western culture and in turn contribute to physicians' own difficulties in accepting the limits to which they are able to cure some chronic conditions (Baszanger, 1989). This can lead to over-treatment and entrenchment in a medical model which may be ultimately damaging to the self-identity and personal experience of those for whom it fails to work (Kleinman, 1988).

Recent qualitative studies provide further support for the notion that the concept of acceptance is highly relevant to the experience of pain and may be associated with

function. A study by Osborn & Smith (1998) explored the experience of chronic pain in a group of patients attending a pain clinic. The authors found that one of the key dimensions of experience which emerged, was comparing oneself with others in the areas of limitation, closely reflecting part of the definition of acceptance of loss based on the work of Dembo et al. (1956). A study by Bendelow & Williams (1996) concluded that some people attending a pain clinic held overly high expectations of pain relief and that this was associated with distress, overdependence and passivity, implying that non-acceptance of pain may be related to poorer adjustment and coping. A recent questionnaire study, based on the transtheoretical model of behaviour change (Kerns, Rosenberg, Jamison, Caudill & Haythornthwaite, 1997), explored whether readiness to adopt a self-management approach to pain is a useful concept in determining who may be able to benefit from cognitive behaviour therapy. The authors found that readiness to adopt a self-management approach was inversely related to beliefs that pain could be controlled and that there was a medical cure, again implying that some degree of acceptance may be a necessary precursor to benefiting from cognitive behavioural approaches. A rarer study of people successfully coping with chronic pain and not seeking treatment, found that acceptance and stoicism were valued as important aspects of being a copier (Large & Strong, 1997).

McCracken's study of acceptance provides more direct evidence of the importance of acceptance in the management of chronic pain. A preliminary study (McCracken, 1998a) found that acceptance, using a measure based on his own definition of acceptance (p. 12 of this report) predicted better psychological and physical function in one hundred and sixty patients seeking treatment at a pain management centre. A further study, using the same measure of acceptance (McCracken, Spertus, Janeck,

Sinclair & Wetzel, 1999), found that participants categorized as adaptive copers, had greater acceptance scores than those categorized as dysfunctional by the West-Haven Yale Multidimensional Pain Inventory (Kerns, Turk & Rudy, 1985).

Studies into the role of acceptance in disability and illness also suggest that acceptance may be associated with better function. Two studies, using measures based on the concept of acceptance of loss based on the work of Dembo et al. (1956), are of interest. A study by Felton & Revenson (1984) found that in four different chronic illnesses, including rheumatoid arthritis, a condition in which pain is a primary feature, success in coping with illness was related to accepting the limitations and losses imposed by the illness. Li & Moore (1998) studied acceptance in a large number of participants with a wide range of disabilities including mental illness, learning disability, visual impairment and back injury. The authors found that acceptance was most strongly related to self-esteem and perceived emotional support. Interestingly, they found that acceptance was lowest in those participants experiencing multiple disabilities or chronic pain, although the possible reasons for this are not discussed. This finding, however, does seem to suggest that acceptance is particularly difficult for people with chronic pain.

These studies, both those which directly investigate the role of acceptance and those in which the notion of acceptance is implied, suggest that promoting acceptance may be a useful focus of clinical interventions which aim to improve physical and psychological function in patients presenting with chronic pain. In order to consider methods of enhancing acceptance in clinical interventions, it may be helpful to explore the relationship of acceptance to cognitions and beliefs about pain, since there

is a considerable body of literature concerning methods of modifying cognitions and beliefs in chronic pain interventions (e.g. Turk, Meichenbaum & Genest, 1983; Gatchel & Turk, 1996).

### **1.8 The relationship between beliefs and acceptance**

Much of the work described above implies that beliefs about pain and illness may be related to acceptance. For example, the belief that pain can be cured, stands out as a belief which is likely to be related to lower acceptance of pain. Therefore, research into the interrelated sets of beliefs which people hold about pain may usefully inform and provide new avenues for exploring the relationship between acceptance and beliefs, in so far as an agreed definition of acceptance can be identified.

Research into beliefs about pain has tended to explore particular concepts rather than attempting to identify the range of co-existing health beliefs.

In a quantitative study, Jensen, Karoly & Huger, (1987) assessed seven beliefs, derived from cognitive-behavioural theory and hypothesized to be relevant to adjustment to chronic pain. These were belief in one's ability to control pain, belief in oneself as disabled by pain, belief that pain signals damage and activity should be avoided, belief that emotions influence pain, belief in a medical cure for pain, belief that others should be solicitous to pain behaviours, and belief in the appropriateness of medication for pain treatment. A factor analysis suggested that there was one underlying factor in the scale devised to measure these beliefs, which the authors called "belief in pain as an illness". The beliefs listed above suggest that this concept

has much to do with beliefs about controlling pain (e.g. that medication is appropriate for pain treatment or that painful activity should be avoided). In a later study, the authors found these beliefs to be related to psychosocial dysfunction and disability (Jensen, Turner, Romano & Lawler, 1994). A further study found that a reduction in belief in pain as an illness was associated with improved physical and psychological function and decreased seeking of health care (Jensen, Turner & Romano, 1994).

Other studies, however, suggest that beliefs about control are only one dimension of a range of beliefs which have been hypothesized to be relevant to health and health behaviour. Arguably, research based on behavioural and cognitive theory in the field of chronic pain has neglected other dimensions which may be important. For example DeGood & Kiernan (1996) examined the relationship between beliefs about cause of pain and functioning in chronic pain patients. They found that the belief that the pain was caused by others (e.g. employer, doctor, vehicle driver) was significantly related to greater distress and behavioural disturbance. This concept of cause of pain, however, does not feature in the list of key beliefs described by Jensen et. al. (1987), suggesting that a broader model may be needed to explore the relationship of acceptance with beliefs about pain.

### **1.9 The relevance of health belief models to the study of acceptance of pain**

A number of social cognition models, from the wider health psychology field, have been proposed and investigated to try to account for the way in which people behave in response to threats to their health. These consider both potential threats such as illness due to smoking, and current illness such as cardiac problems or diabetes.

Models include the health belief model and related concept of health locus of control (Wallston, Wallston & De Vellis, 1984), the theory of reasoned action from which the theory of planned behaviour developed (Ajzen, 1985, cited in Bennett, 2000), and the self-regulatory model (Leventhal, Benyamini, Brownlee, Diefenbach, Leventhal, Patrick-Miller, & Robitaille, 1997). Some of these theories focus primarily on the control dimension of health beliefs, such as the health belief model, but some also consider other dimensions of belief which may be relevant to acceptance.

The self-regulatory model of health behaviour seems to offer a particularly useful basis for exploring the relationship of health beliefs to acceptance. A central part of the model is the consideration of a broad range of health beliefs and the identification of five dimensions of belief, which consistently emerge as constructs, in research into cognitive representations of health and illness. The five dimensions, according to (Leventhal et al., 1997), are beliefs concerning:-

- disease identity or symptom label
- time-line or duration
- perceived consequences or impact
- cause
- controllability or cure

These beliefs are proposed to influence the initiation of behavioural and cognitive responses to illness, the effectiveness of which will in turn affect the beliefs themselves, in a reciprocal way, the process thereby influencing disease outcome. The effects of beliefs about duration and identity are dimensions that have not been widely

considered in chronic pain research and yet might be hypothesized to be important dimensions in the management of chronic pain. For example the concept of identity means the extent to which a range of symptoms such as fatigue, sleep disturbance, nausea or dizziness are considered to be part of the condition. Greater identity might be expected to be associated with greater distress and therefore lower acceptance. Time-line also appears highly relevant to the concept of acceptance since acceptance is not likely to be considered necessary in a condition which is not expected to continue over a long period of time. These dimensions have been found to be predictive of functioning in a number of other chronic illnesses. For example, a study of chronic obstructive pulmonary disease, rheumatoid arthritis, and psoriasis found that a strong illness identity, longer time-line, more serious perceived consequences, and lower belief in controllability were all associated with poorer physical and psychological function (Scharloo, Kaptein, Weinman, Haze, Willems, Bergman & Rooijmans, 1998).

There is considerable support for this model as a useful way of conceptualizing the interplay of health beliefs (Weinman & Petrie, 1997b) and it lends itself to ways of measuring health beliefs whose relationship with measures of acceptance could then be explored. Much of the work developing and identifying these five health beliefs, has been based on interview data, but more recently questionnaire measures have been developed based on this work in order to facilitate research into cognitive representations (e.g. Schiaffino & Cea, 1995; Weinman, Petrie, Moss-Morris & Horne, 1996). Belief questionnaires of equal scope appear to be lacking in the pain field (Scharloo & Kaptein, 1997).

Recent work in the health psychology field has also suggested that dimensions of illness representations as conceptualized by Leventhal et al. can be predictive of engagement in rehabilitation and can influence the recovery process. For example, Petrie & Weinman (1997) found that patients who attended a cardiac rehabilitation programme had significantly stronger beliefs that their illness could be controlled or cured (due to both internal and external control factors) than those who failed to attend. This suggests that the measurement of illness representations based on the model of Leventhal et. al. could also be useful in predicting who will benefit from pain management programme approaches. Closer consideration of this area, however, suggests that relationships between cognitive representations, engagement and outcome on a pain management programme may be complex and that it may be difficult to make specific predictions. For example, on the dimension of control or cure, making predictions may be more problematic than in the study by Petrie & Weinman (1997) of cardiac rehabilitation. Whereas one might expect the belief that pain could be cured to predict failure to attend an approach which explicitly eschews the idea of cure, the emphasis on self-management techniques of pain control in pain management programmes might suggest that other kinds of control beliefs, particularly a greater internal locus of control (Wallston et. al., 1978), would predict greater engagement.

It is also difficult to make predictions regarding the “consequences” dimension of belief. On the one hand, the health belief model, theory of planned behaviour and self-regulation theory all refer to perceived seriousness of an illness as being a motivating factor for engaging in rehabilitation or health-promoting behaviour. More serious perceived consequences, however, are likely to be related to lower acceptance and



might be expected to predict lower engagement and greater drop-out, in an intervention which does not offer hope of a cure for pain. In addition, there may be differential effects on engagement and outcome. The teaching of cognitive and behavioural coping strategies are likely to alter beliefs about controllability and consequences, and so initial beliefs in these dimensions may not be predictive of outcome. Thus, although the measurement of cognitive representations of pain along the same dimensions as in health beliefs may be useful in exploring the nature of acceptance, the likely role of cognitive representations themselves in predicting engagement and outcome in pain management interventions, is unclear, and needs to be approached in an exploratory manner.

#### **1.10 Rationale for the present study**

The research detailed in the foregoing sections suggests that concepts of acceptance and cognitive representations of pain may be useful areas of investigation in predicting who may be most likely to engage in and benefit from pain management programmes, in so far as adequate measures of acceptance and cognitive representations of pain exist. This may in turn lead to a consideration of what alternative strategies may benefit that proportion of patients who currently do not respond to such approaches, and may increase the degree of improvement in those who do show positive benefits.

The definition of acceptance based on the work of Dembo et al. (1956) (p.12 of this report) has been adopted, in order to make predictions about the role of acceptance and its relationship to cognitive representations of pain, as measured by an adapted

version of the illness perception questionnaire (Weinman et al., 1996). This definition was adopted in preference to that of McCracken (1998a) (p.12 of this report) because of its incorporation of the concept of acceptance of loss and because of the inclusion of the concept of control in McCracken's definition, whose relationship with acceptance, as discussed earlier, is considered unclear. Items on control, however, are included in the Illness Perception Questionnaire (Weinman et. al., 1996), and will be examined in an exploratory way.

The following research questions have been identified in order to explore the role of acceptance and cognitive representations of pain in engagement and outcome of treatment on a multidisciplinary pain management programme. A number of hypotheses have been made on the basis of the literature reviewed, and the author's clinical experience.

### **1.11 Research questions and related hypotheses**

- i) *Does a measure of acceptance predict engagement with, completion and outcome of intervention on a pain management programme?*

**Hypothesis:** Since the emphasis of the programme is on self-management and explicitly does not aim to cure pain, low scores on a pain acceptance measure are hypothesized to represent non-acceptance of pain and loss. They are, therefore, predicted to be associated with higher non-engagement and drop-out rates, and poorer outcome in those who complete the programme.

- ii) *Do cognitive representations of pain (i.e. beliefs about pain) predict engagement with, completion and outcome of intervention on a pain management programme?*

The relationship of identity, cause of pain, consequences and control/cure beliefs to expected engagement and completion of the programme is not clear and no hypotheses about the relationship of these dimensions to outcome are suggested. This research question is therefore exploratory with a view to generating hypotheses.

- iii) *Does a measure of acceptance show change as a result of intervention on a pain management programme?*

**Hypothesis:** The emphasis on self-management is likely to increase the acceptability of pain and minimize the impact of continuing disability on function, and thus it is predicted that a measure of acceptance will show increased acceptance as a result of the intervention in those who complete the programme.

- iv) *Do cognitive representations of pain (i.e. beliefs about pain) change as a result of intervention on a pain management programme?*

**Hypothesis:** Since cognitive changes have been found to occur as the result of cognitive behavioural interventions it is predicted that cognitive representations will change as a result of the intervention. Some specific predictions can be made about how each dimension of cognitive representations is expected to change for those who complete the programme.

- a) *Identity*. As the programme aims to decrease attention to pain and physical symptoms, and help participants focus on other aspects of their lives, it is predicted that pain identity will decrease.
- b) *Cause*. Since the programme attempts to help participants stop ruminating on past events and causes of pain, and focuses on present and future functioning, changes were not expected to occur in beliefs about causes of pain. It is therefore predicted that changes will not occur in this dimension of beliefs.
- c) *Time-line*. It is predicted that time-line will increase as participants increasingly accept that the pain will not change, and focus efforts on leading a more satisfying life.
- d) *Consequences*. It is predicted that the perceived seriousness of the consequences of pain will decrease as participants learn new coping strategies and ways of achieving desired goals.
- e) *Control/cure*. It is predicted that overall beliefs in this dimension will not change. Whereas beliefs in cure of pain are likely to decrease as efforts are increasingly directed towards managing activity and lifestyle and attention is focussed away from attempts to eliminate pain, internal control is predicted to increase as new coping strategies are learnt. Changes on the individual items on this scale will also be examined in an exploratory way.
- v) *Is a measure of acceptance associated with cognitive representations of (i.e. beliefs about) pain?*

**Hypothesis:** In both Dembo and McCracken's definitions of acceptance, cognitions are hypothesized to influence acceptance. Therefore it is predicted that a measure of acceptance will be associated with some dimensions of cognitive representations of pain. The following hypotheses are suggested, based on the literature reviewed on pain and cognitions, and the broader health psychology literature.

- a) *Identity.* Greater pain identity will be associated with lower acceptance.
- b) *Cause.* Perceiving that others are to blame for the pain will be associated with lower acceptance, in line with the findings of a study by DeGood & Kiernan (1996).
- c) *Time-line.* Longer time-line will be associated with greater acceptance.
- d) *Consequences.* More serious consequences will be associated with lower acceptance.
- e) *Control/cure.* Overall, belief in control and cure will not be associated with acceptance, since different aspects of this belief dimension may be related in conflicting ways. There will also be an exploratory analysis of individual control items in relation to acceptance.

## **Chapter 2**

### **Method**

#### **2.1 Design**

A quantitative method was chosen, using questionnaire measures, and a mixed within and between subjects design to investigate the different hypotheses.

With a well-established clinical intervention it is not ethically acceptable to assign participants to a no-treatment control group. Therefore the study used a within subjects repeated measures design to investigate changes in acceptance and cognitive representations, with participants acting as their own waiting list controls. A within subjects design was also used to investigate correlations between acceptance and cognitive representations.

A between subjects design was used to compare acceptance of pain and cognitive representations, in participants who did not complete the intervention (either did not engage, or dropped out before completion), and those who completed the intervention.

Multiple regression analyses were considered, to investigate the relationship between initial acceptance and cognitive representation scores with outcome for those who completed the intervention, but the number of participants was not considered great enough to permit meaningful analysis of this kind (see section on power analysis, p. 45).

The independent variables chosen were a measure of acceptance and a measure of five dimensions of cognitive representations of pain. The dependent variables were measures of three dimensions of outcome i.e. physical function, mood and cognitive change. Waiting time, initial perceived severity of pain, and pain duration were also measured to control for the potential influence of these factors.

## **2.2 Participants**

Participants were 116 patients with chronic low back pain, from a sample of 180 consecutive patients attending an assessment appointment for a pain management programme over a period of 14 months. Of the 180 patients, 25 were not asked to participate due to language or literacy difficulties, and a further 39 refused to participate. Of the number who consented to participate in the research, 13 participants did not meet the criteria described below for inclusion in the programme. Since all of these 13 were experiencing chronic pain, it was considered appropriate to include them in analyses of the relationship between measures of acceptance and cognitive representations of pain at assessment. Of the 103 participants assessed as suitable for the programme, 41 did not complete the intervention (27 did not take up the offer of a place on the programme and 14 dropped out during the intervention), and 56 completed the intervention. A further six participants had not yet completed the programme at the time of writing.

The sample of 116 consisted of 42 males and 74 females, aged 20 to 77 years with a mean age of 48. Pain duration ranged from 1 to 55 years with a mean duration of 9.55 years. Seven participants reported low back pain only, 39 reported back and leg pain

and 70 reported multiple sites of pain, including low back pain.

Inclusion criteria for the programme and also the research study were as follows:-

- presence of chronic pain of longer than six months duration
- no further medical investigation or treatment of pain indicated
- significant distress due to pain as measured by clinical interview and the Hospital Anxiety and Depression Questionnaire (Zigmond & Snaith, 1983)
- and/or significant impairment of physical function as measured by physiotherapy assessment and physical measures of function and flexibility
- basic understanding of the English language
- suitable to participate in a group based intervention

### **2.3 Measures: Independent variables**

- i) **The Acceptance of Illness Scale** (Felton & Revenson, 1984) (adapted and renamed “The Acceptance of Pain Scale”, see Appendix 1).

The Acceptance of Illness Scale was chosen as a measure of acceptance. It was adapted for this study by replacing the word “illness” with the word “pain” for each item, and renaming it as “The Acceptance of Pain Scale”. The measure is included in a “Portfolio of Health Measures” and described by Johnston, Wright & Weinman (1995) as a straightforward and brief measure of adjustment/acceptance. It is derived from the conceptualization by Dembo et. al. (1956) of acceptance, as acceptance of loss and a process of value changes, and assesses respondents’ success in feeling “acceptant” and valuable in spite of the problems occasioned by the painful condition.



Additional reasons for choosing this measure were its ease of administration and face validity (i.e. the items reflected difficulties in adjustment described by this patient group, in the author's clinical experience). In selecting this scale it is acknowledged that the concept of acceptance of pain is an area in which further investigation is needed. The extent to which questionnaires published to date adequately measure acceptance of pain, and the validity of adapting this measure are considered in the discussion section.

*Description of measure.* The items are derived from a scale developed by Linkowski (1971) to measure acceptance of disability. The measure uses an eight-item scale in which respondents are asked to rate the degree to which they agree or disagree with statements about their pain e.g. "my pain makes me feel useless at times". A score from one to five is derived for each item and an overall mean score calculated from the scores on each item.

*Psychometric properties.* Felton & Revenson (1984) presented data on 151 participants with one of four chronic illnesses, including arthritis, a condition associated with chronic pain. High internal consistency was found with Cronbach alpha ranging between 0.81 and 0.83 for the different groups. Test-retest reliability over a seven month period was considered reasonable (Pearson's  $r = 0.69$ ). Evidence of construct validity was shown by significant negative correlations with self-blame and the use of wish-fulfilling fantasy as a coping strategy (e.g. hoping a miracle would happen) (Felton, Revenson & Hinrichsen, 1984).

Cronbach alpha for the current sample was computed at 0.78 showing good internal

consistency.

*Consideration of alternative measures* The only report of a scale to measure acceptance of pain is that reported by McCracken (1998a, 1998b). This 34-item questionnaire was rejected because it was not based on a definition of acceptance incorporating the notion of acceptance of loss. In addition some items measured control over pain (e.g. "I can gain control over my pain by decreasing my negative and irrational thinking"), which was felt by the author to be problematic in a measure of acceptance. McCracken himself concluded, in a report of a factor analysis of the scale that believing one can control pain by controlling one's thoughts did not fit his proposed definition of acceptance (McCracken, 1998b)

*Validity tests.* As an attempt to provide validation of the use of the Acceptance of Pain Scale as a measure of acceptance as defined by Dembo et. al. (1956), an adapted measure of acceptance of disability was also administered to 66 of the sample of 116 participants at the initial assessment. The Acceptance of Disability Scale was also adapted from the scale developed by Linkowski (1971), and scores have been found to correlate with physical and psychological function (Li & Moore, 1998). The word disability was replaced with the word pain for each of the 10 items of the scale (see Appendix 2). Having checked that scores on both scales were normally distributed, a Pearson product moment correlation was performed. A large, statistically significant positive correlation was found between the two scales ( $r = 0.77$ ,  $df = 64$ ,  $p < 0.001$ , 2-tailed test). The appropriateness and usefulness of this as a validity check is covered in the discussion section.

As a further attempt to test the validity of the Acceptance of Pain Scale, a preliminary factor analysis was conducted to look for evidence of one underlying factor. A principal factor analysis showed two factors with an Eigenvalue greater than 1. The first, or principal factor, accounted for a reasonable proportion of the total common variance i.e. 39.6%. The second only accounted, however, for a further 15.3% of the variance, which is not much greater than the variance which one item on the scale would be expected to contribute (i.e. 12%) and therefore not considered to be very significant. A scree plot was interpreted as showing a break after the first factor, providing further evidence of a single underlying factor. The value of further analysis and development of this scale is covered in the discussion section.

**ii) Illness Perception Questionnaire (Weinman et. al., 1997) (adapted and renamed “Pain Perception Questionnaire”, see Appendix 3).**

The Illness Perception Questionnaire is theoretically derived from the work of Leventhal et. al. (1997), which identifies five stable dimensions of cognitive representations of illness. This was used as a measure of beliefs about pain because of its inclusion of all five dimensions of belief identified as being relevant to health behaviour. For this study, the Illness Perception Questionnaire was adapted by replacing the word illness with the word pain for each item, following consultation with the first author of the measure about the appropriateness of doing so, and renamed as the “Pain Perception Questionnaire”. Although the authors of the measure reported that the items were intended to be adapted according to the patient group under consideration, the general version items of the scale were adhered to, due to the lack of report of adapted versions with chronic pain populations.

*Description of measure.* The five dimensions measured are illness identity, cause, time-line, consequences and control/cure. To measure identity, respondents are asked to rate how frequently twelve common symptoms are experienced, on a four-point scale from never to always. Weinman et. al. (1997) recommend analysis of the number of symptoms endorsed as a measure of illness identity. However, other studies have used a combination of the number and frequency with which they are reported as a measure of strength of illness identity (e.g. Moss-Morris, Petrie & Weinman, 1996, Heijmans, 1999). In the current study, both number and frequency of symptoms are used to provide a richer source of data. The remaining four scales ask respondents to rate on a five point scale the extent to which they agree or disagree with a number of statements. For the cause scale, ten items list statements concerning possible causes for the condition e.g. “it was just by chance that I got pain”. The time-line scale has three items concerning the length of time the condition is expected to last. The consequences scale has seven items concerning the seriousness of the perceived consequences of the condition. Finally the control/cure scale has six items concerning the degree to which it is perceived that the condition can be controlled or cured, by different means, including internal, external, and chance factors.

*Psychometric status.* Data from 338 patients having had a myocardial infarction and 32 patients undergoing renal dialysis indicated good internal reliability of the identity, time-line, consequences and control/cure subscales, with Cronbach Alpha scores ranging from 0.73 to 0.82. In addition test-retest reliability was high, with significant correlations ( $p < 0.001$ ) on the same four subscales at one and three months, and on all but identity at six months. In the myocardial infarction group, evidence for concurrent validity was found, with positive correlations between the identity scale and reported

disability, using the Sickness Impact Profile (Bergner, Bobbit, Carter & Gilson, 1981), time-line scale and rating of likelihood of a future heart attack, control/cure scale and reported recovery self-efficacy (Recovery locus of Control Scale, Partridge & Johnston, 1989, cited in Weinman et. al., 1989), and finally consequences scale and ratings of disability, distress, recent doctor visits and perceived likelihood of a future heart attack. Discriminant validity was also considered, with different profiles reported on all five scales in four groups of patients i.e. with diabetes, rheumatoid arthritis, chronic fatigue syndrome, and chronic pain. The questionnaire was also found to have predictive validity in the myocardial infarction group, with positive correlations between four dimensions of belief at baseline and various self-rated aspects of health at three and six month follow-up.

For the current sample, Cronbach alpha scores on each subscale, excluding the Cause subscale, which is not an additive scale, were as shown in Table 1.

**Table 1. Cronbach alpha for Pain Perception Questionnaire subscales in the current sample**

subscale	n	Cronbach alpha
Identity	105	0.79
Timeline	112	0.70
Consequences	112	0.77
Control/cure	110	0.67

Issues of validity in applying this measure to the current sample are covered in the discussion section.

*Consideration of alternative measures.* A number of questionnaire measures have

been developed to measure patient beliefs about chronic pain, derived from cognitive-behavioural theory (e.g. Coping Strategies Questionnaire, Rosenstiel & Keefe, 1983;; Survey of Pain Attitudes, Jensen et al. 1987; Pain Beliefs and Perceptions Inventory, Williams & Thorn, 1989). None of these questionnaires, however, measure the range of beliefs identified by Leventhal et al. (1997) and they were therefore not chosen to measure pain beliefs in this study.

#### **2.4 Measures: Dependent variables**

Outcome studies of pain management programmes often report multiple dimensions of outcome (e.g. Williams et al., 1993). In the planning stage of the study, in order to restrict the dimensions to a number which would allow a meaningful analysis of the correlations between independent and dependent variables in the current sample through multiple regression analysis, three key dimensions were measured. Although the eventual sample was not sufficiently large to support the inclusion of this kind of analysis, outcome measurements were still considered important, in order to place the findings of the study within the context of the outcome of the programme intervention. Outcome measures were chosen to reflect the stated aims of the programme, which were to reduce distress, reduce disability and increase confidence in the ability to lead a normal life despite pain. A recent consensus meeting of researchers and clinicians (Johnson, 2001) confirmed the appropriateness of these dimensions of outcome and the suitability of the measures described below.

### **i) Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983)**

*Description of measure.* The Hospital Anxiety and Depression Scale was designed for use with a general medical population with the aim of detecting the presence of anxiety and depression in patients presenting at medical outpatient clinics. It is a fourteen-item questionnaire divided into two subscales. Each tick-box item requires the respondent to identify the statement which best describes their feelings during the previous week and yields a score from zero to three. The items are summed to provide two scores, one for anxiety and one for depression, ranging from zero to 21. In this study the two scores were summed to produce one score for non-specific distress. The rationale for doing this is described below.

*Psychometric status.* An extensive validation study was conducted in 1997 with 6165 participants in six different groups, including patients attending a general practice (n = 112) and general medical outpatients with unexplained somatic symptoms (n = 169) (Spinhoven, Ormel, Sloekers, Kempen, Speckens & Van Hemert, 1997). The other groups were random samples of younger adults, adults aged 57 to 65, older adults and psychiatric outpatients. Test-retest reliability over three weeks was 0.91. Internal consistency was good with average values of Cronbach alpha of at least 0.80.

The two subscale scores were highly correlated, suggesting a non-specific distress factor. A factor analysis suggested a one factor solution in the general medical groups, with the first factor accounting for 44.9% of the variance, providing evidence for the appropriateness of using the whole scale score as a single measure of distress. The authors concluded that a moderate level of mixed anxious-depressed symptom pattern

was found in the general medical groups, in contrast to other groups in which a two factor solution was found.

In the current study sample, a large, statistically significant positive correlation was found between the two subscale scores ( $r = 0.64$ ,  $df = 113$ ,  $p < 0.001$ , two-tailed test). On this basis, it was considered appropriate to use the summed scores from the two scales in the data analysis.

## **ii) Sit to stand repetitions in 30 seconds.**

*Description of measure.* Sit to stand repetitions are a measure of physical function which involve measuring the number of times the participant is able to move from standing up to sitting down on a chair in the specified time. The task “involves putting the spine, hips, knees and ankles through a fairly large range of motion while under load and requires a degree of strength in the major muscle groups around the pelvis, hips, knees and ankles” (Harding, 1993). As such it was considered to be a useful, single measure of physical function. It has been found to be the most sensitive to change of all measures of physical function during attendance at a pain management programme with a heterogeneous group of patients with chronic pain of different sites and with differing diagnoses (Harding, Williams, Richardson, Nicholas, Jackson, Dieudonne & Pither, 1994).

*Psychometric status.* Harding et. al. (1994) conducted a study in which 431 patients on the waiting list for a pain management programme for assessment were asked to perform a number of different physical tasks, including sit to stand repetitions for a



two minute time period. These were repeated after twelve weeks. Test-retest reliability for sit to stand repetitions was 0.84. The half-time count was compared with the full-time count and the correlation was 0.98, indicating that a short form of the test is an appropriate tool and correlates very highly with performance over a longer period of time.

*Validity test.* The study reported by Harding et. al. (1994) did not consider correlations between different functional tests. Therefore, in the current study, the correlation between sit to stand repetitions, and two other commonly used measures of physical function were calculated, using Pearson product moment correlations. Strong negative correlations were found with time taken to walk 25 metres ( $r = -0.71$ ,  $p < 0.001$ ) and a measure of flexion (distance between fingertips and floor in standing with maximum forward flexion whilst maintaining knees in extension) ( $r = -0.54$ ,  $p < 0.001$ ).

### **iii) Pain Self-Efficacy Questionnaire (PSEQ) (Nicholas, Wilson & Goyen, 1991)**

*Description of measure.* The PSEQ is a self-report measure of the degree of confidence in the ability to perform a range of aspects of daily life. Respondents are asked to rate from zero to six, their confidence to do ten different things, such as socializing with family and friends, or carrying out housework, despite the pain. The item scores are summed to produce a total scale score from zero to 60.

*Psychometric status.* In a preliminary analysis of the scale by Nicholas et. al. (1991), it was administered to 103 patients on the waiting list for a pain management programme. Internal consistency was high, with a Cronbach alpha score of 0.92. Test-

retest reliability over two to four weeks was 0.79. Good negative correlations were found with the Sickness Impact profile (Bergner, Bobbitt, Carter & Gilson, 1981) and the Pain Beliefs Questionnaire (Gottlieb, 1984, cited in Nicholas et. al., 1991), which measures the extent to which chronic pain patients subscribe to beliefs which could promote disability and engender psychological distress, providing evidence for the validity of the questionnaire.

## **2.5 Measures: Potential Confounding variables**

### **i) Variable time on waiting list**

The length of time between assessment and the start of the intervention was measured in days to control for the possible influence of length of waiting time on outcome.

### **ii) Pain duration**

The length of time in years from the onset of the pain problem was measured to control for the possible influence which this might have on acceptance, health beliefs and outcome.

### **iii) Severity of pain**

Perceived severity of pain was anticipated to be a variable which could significantly influence acceptance, health beliefs and outcome. In order to investigate whether acceptance and beliefs independently predict outcome, severity of pain was measured at assessment.

*Description of measure.* Participants were asked to rate on a scale of zero to 100 the

average pain experienced during the previous week, from “no pain” to “pain as bad as it could be”. This method has been found to correlate highly with other pain rating procedures (Jensen & Karoly, 1992). Jensen, Karoly & Braver (1986) found the scale to be easy to use and the best of six different measures of pain in terms of practicality and sensitivity.

## **2.6 Procedure**

*Ethical issues.* A research proposal was submitted to the local research ethics committee and was granted chairman’s approval (see Appendix 4). All potential participants were given an information sheet (Appendix 5) to read at the beginning of the assessment appointment. The opportunity to discuss the study was provided by the first clinician seen during the assessment session and written consent (Appendix 6) obtained before including participants in the study.

*Procedure.* The measures were administered at three time points. The first was during the initial assessment appointment for all participants. For those who subsequently attended the programme measures were repeated at the start and end of the intervention. On each occasion the questionnaires were given to the participant to self-administer and physical measures carried out in the presence of a member of the clinical team.

*Description of the intervention* The intervention was a group outpatient pain management programme run by a clinical psychologist, clinical physiotherapy specialist and clinical nurse specialist. Participants attended eight weekly sessions

each lasting two and three quarter hours and a further session lasting one and a half hours approximately one month later. In addition, a significant other was invited to attend one of the sessions designated as a “relatives’ session”.

A range of cognitive and behavioural coping strategies were taught during the programme and tailored to the needs and abilities of individuals in the group. These included a programme of graded exercise, graded reduction of analgesic medication use where appropriate, relaxation techniques, cognitive restructuring to reduce catastrophising and fear- avoidance, goal setting, and advice about managing daily activities. Participants were expected to practice techniques introduced during the course in between sessions.

A detailed outline of the programme content is provided in Appendix 7.

## **2.7 Power analysis**

A series of power analyses were conducted to determine appropriate sample sizes to show effects to a power of 0.8 (Clark-Carter, 2000), using tables published by Clark-Carter (1997). Because of the absence of previous studies applying the Acceptance of Pain Scale and the Pain Perception Questionnaire to chronic pain populations, sample sizes sufficient to detect moderate effect sizes, as defined by Cohen (1988, cited in Clark-Carter, 1997), were calculated. As an attempt to test the appropriateness of using medium effect size to estimate sample size, analysis of previous outcome measures used routinely on the pain management programme under investigation were carried out. These showed medium effect sizes for some dimensions of outcome

in a sample of 66 participants measured at initial assessment and end of intervention (sit-to-stand repetitions,  $d = 0.54$ ; pain self-efficacy score,  $d = 0.51$ ; Hospital Anxiety and Depression Scale,  $d = 0.23$ ).

*i). Between subjects effects.* In order to show an effect size of  $d = 0.5$  for a one-tailed between subjects t-test,  $n = 25$  was calculated to be the number required in each group. This was therefore considered to be the minimum number required. For the analyses in which directional hypotheses were not made, a sample of 70 would be required to detect a moderate effect size (i.e.  $d = 0.5$ ) for a two-tailed t-test.

*ii) Within subjects effects.* Clark-Carter (1997) recommends the use of between subjects ANOVA power tables to estimate approximate sample sizes for within subjects ANOVAs. In order to show a medium effect size (i.e.  $\eta^2 = 0.059$ ), it was estimated that between 50 and 60 participants were required.

*iii). Pearson's product moment correlations.* In order to detect Pearson's moment correlations between acceptance scores and scores on the Pain Perception Questionnaire to a value of  $r = 0.3$ , considered by Cohen to be a medium effect size, an initial sample of 90 was calculated to be required.

*iv). Multiple regression analyses.* To detect a medium effect size (i.e.  $R^2 = 0.13$ ), power tables suggest that with four to six predictor variables (i.e. Acceptance of Pain Scale score and scores from the four scales of the Pain Perception Questionnaire providing interval level data), a sample of 100 participants would be required. Within the time constraints for this study, it was not possible to obtain this size of sample in

those completing the programme. Therefore, multiple regression analyses were not considered appropriate and were not conducted.

v). *Determination of over all sample size.* Based on the above calculations, a minimum initial sample size of 90 was considered appropriate, with a minimum of 50 participants completing the intervention. Since the proportion of the initial sample who would complete the intervention could not be predicted, data was collected at initial assessment until 50 participants had completed the intervention, providing a total initial sample of 116.

## Chapter 3

### Results

#### 3.1 Data analysis

All data analyses were conducted using the SPSS statistical research package (Brace, Kemp & Snelgar, 2000, Kinnear & Gray, 1999).

*i) Between subjects analyses.* To test the hypotheses that scores on the acceptance and cognitive representation of pain measures would predict non-engagement with, and drop-out from intervention, between subjects t-tests were conducted on the Pain Acceptance Scale and the identity (frequency of symptoms), consequences and control/cure scales of the Pain Perception Questionnaire, between participants who completed the intervention and those who did not. The use of one-way ANOVA with three groups i.e. participants who did not engage, dropped-out, and completed was considered but numbers in the first two groups were insufficient to conduct this kind of analysis (see power analysis below). A preliminary analysis showed that scores for the time-line scale of the Pain Perception Questionnaire were skewed and could not be adequately transformed. Therefore the Mann-Whitney U test was used for this scale.

Exploratory analyses of each item on the cause and control/cure scales of the Pain Perception Questionnaire were conducted. The cause scale of the Pain Perception Questionnaire involves the use of individual items scored from zero to four i.e. ordinal data with a low range, unsuitable for parametric statistical analysis. Therefore,

Mann-Whitney U tests were conducted for each item on this scale. Similarly, individual items on the control/cure scale produce scores from zero to four, and these were therefore also analysed using Mann-Whitney U tests. The identity scale of the Pain Perception Questionnaire when used as a measure of number of symptoms endorsed also uses ordinal data from one to twelve, and was also analysed using Mann-Whitney U tests.

*ii). Within subjects analyses.* To test the hypotheses that scores on the Pain Acceptance Scale and the Pain Perception Questionnaire would change as a result of the intervention, repeated measures ANOVAs were planned between values on these measures at the beginning of the waiting control period (T1), the start of the intervention (T2), and the end of the intervention (T3). Correlations between the values of the potentially confounding variables of waiting time, pain duration and pain severity with values at initial assessment on the acceptance and pain perception scale scores were examined. A factorial ANOVA block design was planned, using a median split to categorize participants as high or low on any potentially confounding factors found to be associated with acceptance or pain perceptions. The blocks were then entered as between-subjects factors in the analysis. Repeated within subjects contrasts were explored to determine during which periods significant changes occurred i.e. during the waiting or intervention periods.

For the cause scale and individual items on the control/cure scale of the Pain Perception Questionnaire, non-parametric equivalent analyses were planned i.e. Friedman tests.



To test hypotheses concerning the relationship between scores on the Pain Acceptance Scale and the identity, consequences and control/cure subscales of the Pain Perception Questionnaire, Pearson's product moment correlations were planned. For the time-line scale, individual items on the control/cure scale and the items on the cause scale, the non-parametric equivalent, i.e. calculation of Spearman's rho, was carried out.

### **3.2 Demographic data**

Demographic data concerning age, gender, duration and site of pain have been presented in the method section.

For the 116 participants in the study, average pain severity at initial assessment on a numerical rating scale from zero to 100 was rated as 62.70, ranging from 5 to 100. Waiting time ranged from 10 to 227 days, with a mean waiting time of 90.61 days.

### **3.3 Preliminary analysis of questionnaire measures**

A preliminary analysis of the measures used as independent and dependent variables was conducted to provide data concerning their suitability for use in parametric statistical analyses. Histograms showing distribution of these scores are shown in Appendix 8. Mean scores, range of scores and standard deviation, in the initial sample of 116, are shown in Table 2 for all independent and dependent variables at initial assessment for which parametric statistics were considered. Details of tests of Kolmogorov-Smirnov tests of distribution on these measures are included. Details of means, range of scores and standard deviation for the number of identity items

endorsed, and cause and control/cure scale individual items are shown in Appendix 9.

**Table 2. Summary scores for independent and dependent variables at initial assessment.**

Measure	n	Mean score	Range of scores	Standard deviation	Kolmogorov-Smirnov tests
Acceptance of Pain Scale	111	2.68	1.00 - 4.63	0.81	Z = 0.76, p = 0.78
PPQ identity frequency	105	1.41	0.50 - 2.42	0.44	Z = 0.70, p = 0.72
PPQ timeline	112	3.16	0.33 - 4.00	0.77	Z = 1.66, p = 0.008
PPQ consequences	112	2.60	0.29 - 4.00	0.77	Z = 0.65, p = 0.80
PPQ control/cure	110	2.32	0.40 -4.00	0.62	Z = 1.46, p = 0.03*
Hospital Anxiety and Depression Scale	115	19.03	2.00 – 38.00	8.17	Z = 0.96, p = 0.32
Pain Self Efficacy Questionnaire	112	28.09	1.00 – 59.00	12.62	Z = 0.81, p = 0.53
Sit-to-stand repetitions	111	6.86	0.00 - 20.50	3.46	Z = 0.90, p = 0.40

\*The histogram for this scale shows that the deviation from a normal distribution is due to leptokurtis rather than skew. Clark-Carter (1997) recommends using the p = 0.01 level of significance for kurtosis. This Z value was therefore not considered to achieve significance.

### 3.4 Outcome of intervention

Changes in the measures of outcome of intervention, as well as changes in pain severity are summarized in Table 3. Significant changes were found in all three dimensions of outcome. A significant decrease was found in Hospital Anxiety and Depression Scale scores ( $F = 13.31, p < 0.001$ ), and significant increases in Pain Self Efficacy Scale Scores ( $F = 13.42, p < 0.001$ ) and number of sit-to-stand repetitions in 30 seconds ( $F = 23.48, p < 0.001$ ). There was also a significant decrease in the measure of pain severity ( $F = 13.02, p = 0.001$ ). The main effects occurred during the intervention period, with the exception of sit-to-stand repetitions, for which significant increases were found during both the waiting and intervention periods. Possible reasons for this are considered in the discussion section.

**Table 3: Changes in outcome measures and pain severity in participants who completed intervention**

Scale	n	T1: Initial assessment	T2: Start of intervention	T3: End of intervention	F	Sig. (2-tailed)	Within subjects contrasts
		Mean (s.d.)	Mean (s.d.)	Mean (s.d.)			T1-T2 T2-T3
<b>Anxiety/depression scale</b>	46	20.20	21.11	17.54	13.31	p < 0.001	F=1.93, p=0.17
		(8.43)	(9.21)	(8.47)			F=20.58, p<0.001
<b>PainSelf Efficacy Scale</b>	44	25.75	26.39	33.14	13.42	p < 0.001	F=0.23, p=0.63
		(12.59)	(13.08)	(13.63)			F=15.90, p<0.001
<b>Sit-to-stands</b>	39	6.09	7.21	8.44	23.48	p < 0.001	F=12.38, p=0.001
		(2.85)	(3.74)	(3.92)			F=13.09, p=0.001
<b>Pain severity</b>	47	63.19	67.02	58.89	4.64	p = 0.018	F=3.02, p=0.09
		(20.91)	(22.13)	(22.30)			F=13.02, p=0.001

### 3.5 Summary of between groups analyses

*Hypothesis: Measures of acceptance and cognitive representations of pain will predict engagement with and completion of intervention on a pain management programme.*

Between subjects t-tests were used to test differences in mean scores at initial assessment between participants who completed the intervention and those who did not, for all measures suitable for parametric statistical analysis. No significant differences were found between the two groups on any measure. This data is summarized in Table 4. Exploratory analyses were conducted on individual items of the cause and control/cure items of the Pain Perception Questionnaire, as well as the timeline and identity (number of symptoms endorsed) scales. Again, no significant differences were found between the two groups (see Appendix 10 for details).

**Table 4: Results of between groups analyses for values at initial assessment**

Measure	Completed group		Did not complete group		t	Sig. (2-tailed)
	Mean score	n	Mean score	n		
Acceptance	2.53	53	2.65	39	-0.74	p = 0.46
PPQ identity (frequency)	1.43	51	1.45	37	-0.28	p = 0.78
PPQ timeline	3.23	53	3.12	40	1.10	p = 0.28
PPQ consequences	2.77	52	2.60	41	1.16	p = 0.27
PPQ control/ cure	2.34	52	2.24	39	0.86	p = 0.39
Anxiety/Depression Scale	20.20	56	19.93	41	0.17	p = 0.87
Pain Self Efficacy Scale	26.00	53	27.48	40	-0.58	p = 0.57
Sit-to-stands	6.01	54	6.51	40	-0.82	p = 0.42
Pain severity	64.81	52	60.95	37	0.82	p = 0.43

Because of the unequal group sizes, Levene's test for equality of variance was conducted for all tests and did not reach significance at the 0.05 level for any of the comparisons made

Therefore, the hypothesis that measures of acceptance and cognitive representations of pain would predict engagement with and completion of a pain management programme intervention were not supported.

### 3.6 Summary of repeated measures analyses

*Hypothesis: Measures of acceptance and cognitive representations of pain will change as a result of intervention on a pain management programme.*

Correlations of potentially confounding variables of waiting time, pain severity and pain duration with values at initial assessment on the Acceptance of Pain Scale and subscales of the pain Perception Scale were examined. These showed that pain severity, but not waiting time or pain duration, was correlated with acceptance, and the identity and timeline scales of the Pain Perception Questionnaire (see Table 5).

Therefore, pain duration and waiting time were not controlled for in any further analyses.

**Table 5. Pearson’s correlations between potentially confounding variables and values at initial assessment of Acceptance of Pain Scale and Pain Perception Questionnaire for whole sample**

Confounding variable		Acceptance	PPQ identity	PPQ timeline	PPQ consequences	PPQ control/cure
Pain duration	r	0.02	0.14	0.00	0.03	0.05
	p	0.87	0.20	0.98	0.79	0.66
Pain severity	r	0.22	0.37	0.25	0.16	0.12
	p	0.02*	<0.001**	0.01**	0.10	0.22
Waiting time	r	0.02	0.03	0.02	0.11	0.01
	p	0.88	0.83	0.89	0.40	0.94

\* correlation significant at the 0.05 level (2-tailed)

\*\* correlation significant at the 0.01 level (2-tailed)

Factorial ANOVAs were conducted for those measures suitable for parametric statistical analyses, using the general linear model function in SPSS (Kinnear & Gray, 1999). Although the data on the timeline measure were not normally distributed, they met other assumptions for ANOVA, including independence of participants’ scores, homogeneity of variance, level of measurement and sphericity of data, and were therefore considered to be suitable for parametric analysis (Clark-Carter, 1997). Scores on the Acceptance of Pain Scale and the scales of the Pain Perception Questionnaire were the dependent variables at three time points. A block design was used to control for the effect of pain severity, using a median split to categorize participants as higher or lower pain severity, and entering the blocking groups as between subject variables. Repeated within subjects contrasts were used to identify whether main effects occurred during the waiting or intervention period (see Table 6).

A significant increase was found in the measure of acceptance ( $F = 9.01, p < 0.001$ ), and significant decreases in measures of identity (frequency of symptoms) ( $F = 5.37,$

**Table 6: Main effects of time in 2 (pain severity high vs low) x 3 (time points) factorial ANOVAs, with Acceptance and each PPQ subscale in turn as dependent variable**

Scale (dependent variable)	n	T1: Initial assessment	T2: Start of intervention	T3: End of intervention	F	Sig. (2-tailed)	Within subjects contrasts
		Mean (s.d.)	Mean (s.d.)	Mean (s.d.)			T1 – T 2 T2 – T 3
Acceptance	46	2.53 (0.84)	2.71 (0.90)	3.00 (1.03)	9.15	p < 0.001	F=4.05, p=0.051 F=5.62, p=0.022
PPQ identity (freq)	43	1.44 (0.46)	1.41 (0.49)	1.30 (0.48)	5.95	p = 0.004	F=1.08, p=0.31 F=5.84, p=0.02
PPQ timeline	45	3.33 (0.68)	3.36 (0.71)	3.31 (0.73)	0.04	p = .96	F=0.06, p=0.81 F=0.01, p=0.94
PPQ consequences	44	2.76 (0.69)	2.83 (0.74)	2.51 (0.78)	8.61	p < 0.001	F=0.70, p=0.41 F=16.06, p<.001
PPQ control/cure	45	2.38 (0.45)	2.25 (0.62)	2.34 (0.61)	1.04	p = 0.36	F=1.93, p=0.09 F=01.00, p=0.32

p = 0.007), and consequences (F = 8.22, p < 0.001). Within subjects contrasts showed the main effects occurring during the intervention period but not in the waiting period, although there is a trend of increasing acceptance score during the waiting period which almost reaches significance (F = 4.05, p = 0.051). There were no significant interactions between main effects of time on these scales and the blocking groups of high or low pain severity (see Table 7).

**Table 7. ANOVA source table showing significant effects on repeated measures factors and interactions with blocking groups of pain severity**

Time effects:Source	df	Mean square	F	Significance
Acceptance	2	2.56	9.15	p < 0.001
Acceptance x pain blocking group	2	0.00	0.01	p = 0.99
Identity	2	0.23	5.95	p = 0.004
Identity x pain blocking group	2	0.02	0.70	p = 0.50
Consequences	2	1.19	8.61	p < 0.001
Consequences x pain blocking group	2	0.32	2.29	p = 0.11

There were no significant changes in the timeline and control/cure scales of the Pain

## Perception Questionnaire.

For the identity (number of symptoms endorsed) scale, and individual items on the cause scale and the control/cure scale of the Pain Perception Questionnaire, Friedman tests were conducted ( see Table 8).

Because of the number of comparisons, Bonferroni corrections were used to determine the appropriate level of significance. Using this method,  $p = .005$  for the cause scale items and  $p = .008$  for the control/cure scale items were used as the criterion for significance. There were no significant differences in the ratings given to the three different assessment points on any of these dimensions, except on the item “there is a lot which I can do to control my symptoms” on the control/cure scale. Mean values on this item were 2.32 (s.d. = 1.07) at initial assessment, 2.14 (s.d. = 0.98) at start of intervention, and 2.57 (s.d. = 1.04) at end of intervention. On this item there was a significantly different rating given to the three different assessment points (chi-square = 10.04,  $df = 2$ ,  $p = 0.007$ ,  $n = 47$ ). Post-hoc pairwise comparisons were conducted, using an equation provided by Clark-Carter (1997, p. 512) to correct for multiple comparisons. There was a significant change between start and end of intervention ( $z = 2.62$ ), but not between initial assessment and start of intervention ( $z = 0.84$ ) or initial assessment and end of intervention ( $z = 1.78$ ).

The hypothesis that acceptance and cognitive representations of pain would change as a result of the intervention were, therefore, supported. With regards to specific predictions made about changes in the Pain Perception Questionnaire subscales, the hypothesis that perceived consequences would decrease was supported. The

**Table 8. Results of Friedman tests to compare values of individual items on the cause and control/cure scales of the Pain Perception Questionnaire at initial assessment, start and end of intervention.**

Scale item	n	T1: Initial assessment	T2: Start of intervention	T3: End of intervention	Chi-square	Sig. (2-tailed)
		Mean (s.d.)	Mean (s.d.)	Mean (s.d.)		
<b>PPQ identity ( number of items endorsed)</b>	48	9.50 (2.11)	9.23 (2.36)	9.54 (2.18)	2.46	0.293
<b>Cause scale item</b>						
<b>Germ/virus</b>	51	0.39 (0.90)	0.33 (0.86)	0.29 (0.78)	1.93	0.381
<b>Diet</b>	51	0.53 (0.99)	0.61 (0.87)	0.57 (0.98)	0.89	0.641
<b>Pollution</b>	50	0.56 (1.05)	0.46 (0.79)	0.40 (0.90)	2.20	0.333
<b>Heredity</b>	51	1.08 (1.35)	1.22 (1.38)	0.94 (1.33)	4.71	0.905
<b>Chance</b>	51	1.71 (1.50)	1.65 (1.49)	1.92 (1.49)	1.11	0.574
<b>Stress</b>	51	1.49 (1.46)	1.41 (1.28)	1.67 (1.34)	0.93	0.627
<b>Own behaviour</b>	51	1.02 (1.22)	0.92 (1.20)	1.29	3.48	0.175
<b>Other people</b>	49	1.45 (1.61)	1.47 (1.67)	(1.43)	2.40	0.302
<b>Poor medical care</b>	51	0.80 (1.20)	1.06 (1.26)	1.06 (1.26)	6.68	0.036
<b>State of mind</b>	51	0.75 (1.07)	0.76 (1.05)	0.69 (1.07)	1.13	0.569
<b>Control/cure scale item</b>						
<b>Will improve in time</b>		1.46 (1.07)	1.50 (1.22)	1.40 (1.12)	1.27	0.529
<b>Lot I can do to control</b>		2.31 (0.94)	2.14 (0.98)	2.57 (1.04)	10.14	0.007**
<b>Little can be done to improve</b>		2.12 (1.03)	2.08 (1.04)	1.80 (1.24)	6.10	0.047
<b>Treatment will be effective in curing</b>		1.82 (0.83)	1.86 (0.96)	1.69 (1.10)	3.40	0.182
<b>Recovery dependent on chance</b>		0.88 (1.01)	1.00 (1.15)	1.00 (1.26)	0.63	0.731
<b>What I do determines whether better or worse</b>		2.92 (0.93)	2.59 (0.91)	2.96 (1.00)	4.79	0.091

\*\* This finding was significant at the 0.01 level. Post hoc comparisons on this items using an equation for multiple comparisons in Friedman tests provided by Clark-Carter (p. 512) resulted in the following Z values:-

$$\begin{aligned} T1 - T2, z &= 0.842 \\ T2 - T3, z &= 2.624 \\ T1 - T3, z &= 1.782 \end{aligned}$$

The critical value of z for significance at the 0.01 level was  $z = 2.5$ . Therefore, ratings assigned to the mean scores only differed significantly between T2 and T3.



hypothesis that illness identity would decrease was supported in a measure of frequency of symptoms endorsed, but not in a measure of number of symptoms endorsed. The hypothesis that perceived time-line would increase was not upheld. The hypothesis that beliefs about cause of pain would not change was supported. The hypothesis that cause and control/cure scores would not change were also upheld. Exploratory analysis of items on this scale showed significant change during the intervention period on only one item (there is a lot which I can do to control my symptoms). However, due to a decrease in mean score on this item during the waiting period, change between assessment and end of intervention was not significant (see Table 9, p. 54 for a summary).

### **3.7 Relationship of acceptance scores and Pain Perception Questionnaire scale scores**

*Hypothesis: A measure of acceptance will be correlated with cognitive representations of pain. Specifically, greater acceptance will be positively correlated with lower identity, longer timeline, and negatively correlated with perceived consequences and blaming others for causing the pain. Acceptance will not be related to the over all score on the control/cure scale, but will be related to internal control.*

Pearson's product moment correlations were used to investigate the relationship between acceptance scores and the identity (frequency), consequences and control/cure dimensions of the Pain Perception Questionnaire. For the timeline scale, the identity (number of symptoms endorsed) scale, the other blame item of the cause scale and the individual items of the control/cure scale parametric statistical analyses

were not suitable, and Spearman's rho was calculated for these items. The results are summarised in Table 8.

**Table 8: Summary of correlations of acceptance scale scores with Pain Perception Questionnaire scale scores**

PPQ scale/item	n	Correlation with acceptance score	2-tailed significance
		Pearsons r	
Identity (freq)	102	-0.43	p < 0.001
Consequences	109	-0.72	p < 0.001
Control/cure	108	0.07	p = 0.64
Spearman's rho			
Identity (no.symptoms)	106	-0.24	p = 0.013
Timeline	108	-0.13	p = 0.19
Other blame cause	109	-0.06	p = 0.51
<u>Control/cure scale items</u>			
Will improve in time	111	0.13	p = 0.18
Lot I can do to control	111	0.16	p = 0.09
Little can be done to improve	111	-0.11	p = 0.27
Treatment will be effective in curing	111	0.05	p = 0.60
Recovery dependent on chance	111	0.04	p = 0.68
What I do determines whether better or worse	111	-0.04	p = 0.65

There was a significant negative correlation between scores on the acceptance measure and the consequences scales of the Pain Perception Questionnaire ( $r = -0.72$ ,  $df = 107$ ,  $p < 0.001$ , two-tailed test). There was also a significant negative correlation between the acceptance measure and the identity scale of the PPQ, both with the frequency of reported symptoms ( $r = -0.43$ ,  $df = 101$ ,  $p < 0.001$ , two-tailed test), and with the number of symptoms endorsed ( $\rho = -0.24$ ,  $df = 105$ ,  $p = 0.013$ , two-tailed test). No significant relationship was found between the acceptance measure and the control/cure scale (whole scale score or individual items), timeline scale, or the other blame item of the cause scale.

The overall hypothesis that acceptance would be associated with cognitive representations of pain was supported. The specific hypotheses that acceptance would be negatively correlated with identity and perceived consequences of pain were supported. However, the hypotheses that acceptance would be positively correlated with timeline, and negatively correlated with blaming others were not supported. The hypothesis that the control/cure dimension of the Pain Perception Questionnaire would not be associated with acceptance was supported.

A summary of which hypotheses were supported by the results of the study are shown in Table 9.

**Table 9: Summary table of results in relation to hypotheses**

Hypothesis	Was hypothesis supported?
i) A measure of acceptance will predict engagement, completion and outcome of intervention on a pain management programme	No
ii) Cognitive representations of pain will predict engagement, completion and outcome of intervention on a pain management programme.	No
iii) A measure of acceptance will change as a result of intervention on a pain management programme	Yes
iv) Cognitive representations of pain will change as a result of intervention on a pain management programme	Yes
- pain identity will decrease	Partially supported
- perceived cause will not change	Yes
- timeline will increase	No
- perceived consequences will decrease	Yes
- control/cure scale score will not change	Yes
- internal control will increase	Partially supported
v) A measure of acceptance will be associated with cognitive representations of pain	Yes
- lower acceptance will be related to greater pain identity	Yes
- blaming others for cause of pain will be related to lower acceptance	No
- longer timeline will be related to greater acceptance	No
- serious perceived consequences will be related to lower acceptance	Yes
- belief in control/cure will not be related to acceptance	Yes

## **Chapter 4**

### **Discussion**

#### **4.1 Interpretation of results**

##### **4.1 .1 Outcome of pain management programme intervention.**

The outcome variables demonstrate significant change in the directions expected. A significant decrease in distress scores on the Hospital Anxiety and Depression Scales, increase in self-efficacy scores and increase in sit-to-stand repetitions provide evidence for the efficacy of the intervention in reducing distress, producing positive cognitive change and improving physical function. These changes are consistent with the findings of numerous studies of outcome of cognitive-behavioural interventions for chronic pain (Morley et al., 1999) and multidisciplinary pain management programme interventions based on cognitive-behavioural principles (Williams et al., 1993).

Within subjects contrasts show that significant change occurred in the intervention period but not during the waiting control period, except for sit-to-stand repetitions which increased significantly during the waiting control period as well as during the intervention. It is beyond the scope of this study to discuss in depth the potential reasons for this. However, it is worth noting the possibility that the initial assessment could have had an effect in reducing fearful avoidance of activity, or that the demand characteristics of measuring physical activity during initial assessment may have been different to measuring the same activity at the beginning of the intervention. The

problems of participants acting as their own waiting list controls in this study are considered later.

#### **4.1.2 Changes in acceptance**

A measure of acceptance of pain based on Dembo's definition of acceptance as acceptance of loss and a process of value changes, showed significant change during the intervention period, providing evidence that participants' acceptance increased. In the context of the overall positive changes in psychological and physical function reported above, this suggests that acceptance of loss and associated value changes may be an important dimension of change on pain management programmes. To date, little attention has been paid to this aspect of acceptance in the study of adjustment to chronic pain. In the related field of disability, correlations between similar measures and measures of adjustment have been found (Li & Moore, 1998), suggesting that acceptance of loss is associated with improved function. However, the strong dominance of behavioural models in psychological interventions for chronic pain has led to an emphasis on reducing pain behaviour and increasing functional ability (Fordyce, 1974). Although the role of cognitions and beliefs are increasingly the focus of clinical interventions (e.g. Main & Spanswick, 2000), achieving change in these dimensions is still seen primarily as a route to reduce chronicity. This is reflected in McCracken's (1998a) definition of acceptance which incorporates the notion of "behaving as if pain does not necessarily imply disability", but does not incorporate the notion of accepting continuing disability which remains in spite of cognitive-behavioural interventions.

The current study findings suggest that it may be important to lay emphasis not only on improving function, but also on accepting enduring losses. How interventions could address these two potentially conflicting goals, is an area which would need further investigation, and is further discussed under the section considering implication of the findings for further research.

#### **4.1.3 Changes in cognitive representations**

The results also support the hypothesis that cognitive representations of pain change as a result of the intervention.

The specific hypothesis that perceived consequences of pain would decrease was supported, lending further support for the notion that acceptance and change may be associated with a process of value changes. Changes on this dimension of the Pain Perception Questionnaire could be a reflection of participants increasingly valuing their current and potential abilities and assets, and diminishing the value of the losses associated with their pain. The absence of evidence supporting predicted changes in timeline, suggests that changes in beliefs about consequences are not a function of changes in expectations about the duration of the problem.

The lack of change in timeline scores may be due to a ceiling effect. Initial high scores on this dimension of belief suggest that the majority of patients presenting for assessment at the pain management programme already consciously acknowledge the reality of their pain continuing in the long term. In spite of this, acceptance appears to be low in comparison with other groups. Scores on the acceptance of pain scale in the

current study, even after intervention, were lower than in the samples of participants with diabetes and rheumatoid arthritis used in Felton & Revenson's (1984) study. Whereas comparisons with different samples in a different study need to be treated with caution, this may be a further indication that acceptance is a significant difficulty for patients with chronic pain. This is in line with Li & Moore's (1998) finding that people with chronic pain as part of their disability had lower scores on a measure of acceptance than other disability groups. Thus acceptance does not seem to be simply a function of expecting pain to last a long time, since low acceptance was shown in the current study to co-exist with long timeline beliefs.

There was mixed evidence concerning changes in pain identity. Although the number of symptoms endorsed did not change significantly, there was a significant decrease in a measure of strength of pain identity i.e. reported frequency of the range of symptoms endorsed. This suggests some decrease in the degree of perceived symptomatology, but not in the range of symptoms experienced. Whether this reflects changes in beliefs about pain identity or is simply a reflection of a reduction in symptoms experienced is debatable. The extent to which the Pain Perception Questionnaire adequately measures pain identity in the current study sample is covered in the section considering limitations of the study on page 66.

The predictions that beliefs in cause of pain, and overall control/cure beliefs would not change were upheld. Examination of individual items on the control/cure scale suggest that significant change did not occur on any dimension of control beliefs measured, with the possible exception of internal control beliefs. The significance of the increase in mean score on the item "there is a lot which I can do to control my

symptoms” between start and end of assessment is brought into question by the observation that scores on this item decreased somewhat during the waiting period. The increase in mean score from initial assessment to end of intervention, as a result, was non-significant. This evidence of change in internal control beliefs is therefore considered to be weak, particularly as significant changes were not found in a similar item (i.e. what I do can determine whether my pain gets better or worse”).

These mixed findings may reflect an inadequate method of measuring internal control of pain. More detailed measures of this dimension which are available (e.g. Multidimensional Health Locus of Control, Wallston et. al., 1984; Beliefs in Pain Control Questionnaire, Skevington, 1990) may have enabled firmer conclusions to be reached concerning the effect of the intervention on control beliefs. However, Skevington (1996) points out that findings concerning the value of an internal locus of control have been mixed and that it may be counterproductive when there is little chance in reality of controlling symptoms. This mirrors McCracken’s inclusion of “abandoning unproductive efforts to control pain” in his definition of acceptance of pain. However, the lack of change on this item might tentatively be interpreted to suggest that participants neither abandon attempts to control pain or increase their sense of being able to control pain as part of the process of benefiting from the intervention. This is considered further in light of the pattern of correlations found between acceptance of pain scores and the dimensions of the Pain Perception Questionnaire.



#### **4.1.4 Relationship of acceptance to cognitive representations of pain.**

The expected relationship between lower acceptance, greater pain identity and more serious perceived consequences was found. Although there has not been much written about these dimensions of belief in quantitative studies in the pain field, a number of qualitative studies have illuminated the seriousness of perceived consequences, in both chronic pain (e.g. Bendelow & Williams, 1996, Osborn & Smith, 1998), and other chronic illnesses (Charmaz, 1983). These studies describe the considerable difficulty which participants experience in adjusting to these conditions, adding support to the common sense notion that greater perceived symptomatology and perceived losses are likely to be more difficult to accept.

The expected relationship of greater acceptance with longer timeline was not found. This suggests that the intellectual recognition that pain is likely to continue, is not necessarily associated with emotional acceptance of the condition. Participants demonstrated that acceptance of pain was still difficult even when they did not expect it to be short-lived, a finding which again has resonance with the above-mentioned qualitative studies. Much has been written, in recent years, about the need to help people with chronic pain have realistic expectations, and the potential adverse effects of offering unrealistic hopes of a cure (Loeser & Sullivan, 1995, Waddell, 1996). However, whilst important as a first step towards acceptance, this may not be sufficient to help chronic pain sufferers come to terms with the emotional consequences of their continued symptoms.

The prediction that acceptance would not be related to overall beliefs about control and cure was supported. In addition, exploration of individual items on this scale did not offer strong support for the influence of either internal or external control or cure beliefs on acceptance. Taken together, these findings support the suggestion of McCracken (1998b) that control beliefs may not be a key feature of acceptance in chronic pain populations. However, it is worth noting that the meaning of the word control is not always clear and could be open to different interpretations by participants. For example, controlling pain could be interpreted as reducing it, or avoiding activity associated with increases in pain, an interpretation which would be expected to be associated with poorer adjustment (Asmundsen et. al., 1999, Vlaeyen & Linton, 1999). On the other hand, it could be interpreted as meaning regulating activity, to avoid swings between periods of overactivity, resultant exacerbated pain, and periods of prolonged rest, an interpretation which would be expected to be associated with better adjustment (Haythornthwaite et. al., 1998). It is argued, therefore, that the meaning of the concept of control in chronic pain is complex, and may, itself, need further investigation.

Finally, the hypothesis that blaming others would be related to the measure of acceptance was not supported, and no relationship was found between any item on the cause scale and the acceptance measure. This suggests that, in the current sample, blame was not a key determinant of adjustment, in contrast to the finding of the study by DeGood & Kiernan (1996). This suggests a need for further research in this area.

#### **4.1 .5 Acceptance and cognitive representations of pain as predictors of engagement and outcome**

Neither the acceptance measure, nor any dimension of cognitive representations of pain, predicted engagement with or completion of intervention.

The lack of predictive value of the independent variables could be a reflection of a set of complex and potentially conflicting set of motivating factors. For example, the self-regulatory model suggests that more serious perceived consequences will predict engagement in rehabilitation programmes (Leventhal et al. 1997). The finding of Kerns et al. (1997), however, that belief in a medical cure predicted non-engagement with a self-management approach, suggests that lower acceptance of the long-term nature of pain, which in the current study was associated with more serious perceived consequences, would be predictive of non-engagement. Further work clearly needs to be done to investigate the interrelationship of these motivating factors.

Another possible reason for the lack of predicted differences between the groups could be a lack of homogeneity within the groups. Because of the size of the sample, it was not possible to treat participants who did not engage, and those who dropped out, as different groups. It could be conjectured, however, that different belief patterns might be found in these two groups, although further research would be needed to investigate this possibility.

It is possible that there were other differences between the two groups compared, which were not measured. Whether the Pain Perception Questionnaire adequately

measures key dimensions of belief relating to health behaviour in a chronic pain population is discussed in the following section concerning limitations of the study. The study's failure to find cognitive predictive factors, could, however, reflect a greater influence of non-psychological factors. For example, factors such as travelling distance or access to private transport for the journey to the hospital where the intervention was carried out, could be the most important determinants of who attends and completes this kind of intervention.

## **4.2 Limitations of the study**

The implications of the study findings need to be considered in the context of the limitations in design and methodology. Three areas of limitation are discussed. These are a critique of the measures used, a consideration of the study design and a discussion of the implications of the nature of the sample.

### **4.2.1 Measures**

#### *i). Outcome measures.*

The study does not measure some dimensions of outcome which have been identified as important by researchers and practitioners in the field (Haines, Blair & Osborn, 1997; Johnson, 2001). These include changes in use of analgesic medication, changes in work status and health care usage e.g. visits to doctors or accident and emergency departments. Difficulties in finding ways of measuring these dimensions of outcome which are reliable without being highly time-consuming, precluded their inclusion in

this study. However, they should not be discounted as important indicators of outcome, particularly in a field where continued symptomatology is the norm, and which are likely to be affected by the concepts of acceptance and cognitive representations under investigation.

The outcome measures used in this study, however, are considered to be acceptable measures in three key dimensions i.e. distress, cognitions and physical function (Johnson, 2001), which are all widely used in the measurement of outcome in chronic pain interventions, and have been found to be highly correlated with other indicators of function within the same dimensions (Herrmann, 1997; Nicholas et. al.,1991; Harding,1993).

#### *ii) Measure of acceptance*

In the design stage of this study, the acceptance of illness questionnaire was adopted as a “straightforward, easy to use measure” (Johnston et. al., 1995) that was theoretically derived, had been applied in studies which included participants with chronic pain (Felton & Revenson, 1994; Li & Moore,1998), and which, in the author’s clinical experience, seemed to reflect some of the kinds of difficulties patients reported in adjusting to their pain. In addition, the definition of acceptance on which it was based had similarities with that adopted by McCracken (1998a) as a basis for developing an acceptance of pain questionnaire. It was therefore considered appropriate to adapt the acceptance of illness questionnaire, replacing the word illness with the word pain. This was preferred to using McCracken’s questionnaire, which focussed solely on behavioural aspects of acceptance, did not incorporate the concept

of acceptance of loss, and included items related to control over pain (McCracken, 1998b).

It is important to acknowledge, however, that the questionnaires may be measuring different aspects of acceptance, which may have different relationships with cognitive representations and interventions on a pain management programme. McCracken's definition describes acceptance of painful sensations and is closely linked to the concept that avoidance of painful sensations is unhelpful and associated with greater disability and distress (Asmundsen, Norton & Norton, 1999, Vlaeyen & Linton, 2000). Its derivation from behavioural theory is apparent on its focus on behavioural concomitants of acceptance. Dembo's definition, on the other hand, defines acceptance as loss and a process of value changes, thus emphasising emotion and cognitive meaning. It is based on the premise that the loss is irreversible and that the task of adjustment is to accept the loss and change.

The use of a questionnaire which emphasizes acceptance of loss was considered appropriate. Whilst there is good evidence that some function can be restored by the application of cognitive-behavioural theory in this patient group (Morley et. al., 1999), it can be argued that there are enduring losses for the majority, even after such interventions. Recent qualitative studies are beginning to raise awareness of the extent to which these ongoing difficulties need to be recognised and addressed and cognitive-behavioural approaches have been criticized for failing to do so (Crossley, 2000).

It is suggested, however, that acceptance of painful sensations and acceptance of loss may be two dimensions of acceptance in chronic pain patients, whose interrelationship has not, to the author's knowledge been explored to any great extent.

The use of the adapted Acceptance of Illness Questionnaire is hypothesised to measure the acceptance of loss dimension. A strong correlation between this measure and another adapted measure of acceptance of disability supports this hypothesis. However, these measures may lose some validity in being applied to a different population from that with which they were first developed. Further work is needed to provide validity for their use as measures of acceptance of loss in chronic pain patients, and to explore their relationship with other dimensions of acceptance. In addition, further analysis of scale items through factor analytic techniques may be useful as a basis for further refinement and development of the scales.

### *iii) Adapted Illness Perception Questionnaire*

The Illness Perception Questionnaire was designed to be a flexible tool, which could be adapted for use with different patient groups by substituting the appropriate word for the condition under investigation for the word illness. Its usefulness lies in its attempt to map the broad spectrum of dimensions of illness perceptions that have been suggested to be key features of such representations. However, whereas some data are presented by Weinman et. al. (1996) for chronic pain patients, much of the data concerning validation is with patients following myocardial infarction. It has not been widely validated with chronic pain patients and further work is needed in this area. In

the current study, data from this measure suggest that its use as a predictive measure with this group in its standard form presents some difficulties.

The timeline scale shows a ceiling effect, which might be expected in a patient group who have often been explicitly told that their main presenting symptom is incurable by known medical interventions. This means that it is unsuitable for use in some kinds of parametric statistical analyses.

The identity scale is also somewhat problematic in that pain is a symptom occurring in a heterogeneous group with a wide range of diagnoses (or in many cases a lack of a positive diagnosis). In addition, some symptoms experienced, such as nausea and dizziness, could be a result of medication used to control pain rather than a symptom of the underlying condition. It is therefore difficult to assess how much perception of a variety of symptoms reflects a coherent illness identity and this scale is probably best viewed as a measure of perceived symptomatology or degree of perceived illness.

Finally the control/cure scale is likely to have a very different meaning in a group whose symptoms are not expected to be resolved, than in a group such as myocardial infarction patients, where complete recovery can be expected for many. Control and cure may be two different dimensions of cognitive representation and the internal/external dimension of control may need to be distinguished in studies with the patient group under investigation. In a review of studies of control beliefs in chronic pain, Skevington (1996) concluded that the evidence favoured the view that a combination of beliefs about control are likely to be the most adaptive in a condition where cure is not achievable. For example, she suggested that strong beliefs in



internal control, combined with strong beliefs in control by powerful others, such as doctors, may be the most adaptive set of beliefs where collaboration between self-management and medical management (e.g. advice about medication use), is generally considered appropriate. A single, summative scale may, therefore, not be the most useful way of exploring the relationship of control/cure beliefs with other aspects of functioning in chronic pain populations.

In summary, the Illness Perception Questionnaire is considered to be a useful measure in that it applies a different concept in the measurement of health beliefs to those which have been developed within the cognitive-behavioural field which dominates research into psychological management of chronic pain. As such, it offers a potentially interesting and useful tool in the development of theory and clinical practice in interventions for chronic pain. However, some aspects may not apply as well as they at first appear to with this population in the form in which they are measured in the standard version of the measure. Further validation and probable modification of the tool for use with this patient group are, therefore, needed.

#### **4.2.2 Study design**

The use of participants as their own waiting list controls has limitations, which need to be acknowledged. Measurements at the beginning of the waiting control period are taken during a multi-disciplinary assessment, which is likely to influence participants' beliefs and behaviour and may, itself, have a therapeutic effect. For example it is possible that discussion of the rationale and aims of the programme could result in a reduction of fearful avoidance of activity. In addition the demand characteristics may

be different at the different points of measurement. It could be conjectured that at assessment participants might be motivated by a need to communicate how difficult their problems are, whereas at the start of the intervention they may wish to demonstrate their commitment to the approach. Either of these factors could underlie the significant increase in sit-to-stand repetitions found during the waiting control period in this study.

Caution also needs to be exercised in interpreting the meaning of changes in the value of measures at the beginning and end of the intervention. At the end of the intervention, measures may be influenced by a desire to show gratitude to the staff involved, and not solely reflect underlying changes in the dimension being measured.

Another issue concerning the use of the waiting list as a control in this way is the variable length of time between assessment and the start of the intervention. The effects of this were controlled for in the statistical analyses of within subjects effects. In design terms, however, a real experimental control group, would have been preferable as a comparison group with the active intervention group.

#### **4.2.3 The sample population**

The heterogeneous nature of the sample has already been mentioned, and the extent to which the identity scale of the Pain Perception Questionnaire is meaningful in this sample. This could also apply to other dimensions of belief measured by the questionnaire, which might be expected to have different characteristics, depending on diagnosis, or lack of a positive diagnosis. Thus, the lack of predictive value of the

PPQ could reflect differences between subgroups of participants, which cancel each other out, rather than it having no predictive value with more clearly defined homogeneous groups. The small size of the sample in the current study, and difficulties in finding a reliable way of categorizing participants by diagnosis, means that it was not possible to investigate this hypothesis.

There are other issues concerning the size of the sample. It could be argued that it would have been preferable to treat participants who did not engage, and those who dropped out of intervention, as different groups, as again, there may be differences between cognitive representations and acceptance beliefs in these two groups. This could potentially be a factor in the study's finding of a lack of differences between those who completed and those who did not complete the intervention. Given the small number of fourteen participants who dropped out, however, a much larger study would be needed to allow meaningful analysis of differences between these two groups. Furthermore, the size of the sample was not large enough to investigate the contribution of beliefs about pain and acceptance beliefs to changes in outcome variables by multiple regression analyses.

#### **4.3 Implications of the current study for clinical practice**

The measures of acceptance and cognitive representations of pain used in this study did not predict who would engage in and complete the intervention. This, together, with previous failure to find general psychological predictors of outcome (Talo et.al., 1994) suggests that it may be unhelpful to exclude potential participants from pain management programme interventions on the basis of cognitive factors or beliefs

about pain, since there is insufficient evidence to predict how these will affect outcome. Current recommended practice of careful multidisciplinary assessment (Main & Spanswick, 2000), consideration of individual needs, and careful discussion with the patient about how the intervention may or may not meet these needs, particularly focusing on readiness to adopt a self-help approach (Kerns et. al., 1997) seems to be a more helpful approach.

The findings do, however, suggest that, once engaged in the intervention, a balance between developing coping strategies aimed at improving physical and psychological function, and promoting the acceptance of irreversible losses and limitations, may be a useful development of pain management approaches. It may be useful to consider why this balance has not been discussed more widely in the pain management field.

Pain management programmes have developed in a field in which medical models of pain have been dominant and still underpin much clinical practice, in spite of the increasing body of evidence for the role of psychosocial factors in the development and maintenance of chronic pain and disability (Gatchel & Turk, 1999). In this context, pain management programmes have had to present convincing evidence of their effectiveness in order to compete for funding. The rapid expansion in the number of pain management programmes in the U.K. in recent years (Main & Spanswick, 2000) is likely to be a reflection of their success in achieving this. One of the main concerns in planning health care services, both in the U.K., and in other European countries, is the need to reduce the health care and social costs of health problems, as well as reducing symptomatology (Appleby, 1996; Van Tulder, Koes & Bouter, 1995). Thus, arguments for the development of pain management programmes have

focussed not only on their effect on improving psychological and physical function, but also on their effect on reducing social and health care costs. Through the emphasis on self management of pain, and encouragement to return to activities such as work in spite of pain, it is argued that there are considerable savings in health care costs and costs of disability benefits (Linton, 1998, Maniadakis & Gray, 2000). These kinds of issues may make it difficult for pain management programmes to publicly acknowledge the limits to which losses due to pain can be reversed, and the need to address losses which endure.

The current study findings, in the context of other recent research implicating acceptance as a key factor in adjustment to chronic pain, suggests that this focus on seeking ways of producing greater change in physical and psychological function may not be sufficient, if it occurs at the expense of helping patients to acknowledge the reality of some of their losses and deal with those aspects of loss which cannot be reversed. Paradoxically, helping patients accept such losses may, in itself, help to promote better physical and psychological function, and this may need to be emphasized if acceptance of loss is to be seen as a goal of intervention. Some thought may be needed to consider how current elements of programmes may be adjusted to take into account the need to promote acceptance, and whether additional interventions need to be incorporated which specifically aim to increase acceptance.

Knowing that the pain is likely to continue for a long time does not seem to be sufficient to ensure acceptance. This may be a necessary precursor to acceptance (Waddel, 1996), but acknowledging the nature and importance of the losses associated with this realization, may be equally important. Further strategies, aimed at

helping participants to positively reassess the value of their current assets and capabilities, and reduce the value of losses which cannot be reversed, may be helpful in reducing the seriousness of perceived consequences of the pain, thereby increasing acceptance. In addition, shifting the focus of attention away from pain and related symptoms, towards other, more potentially satisfying aspects of life, also appears to be helpful, and fits well with current goal setting elements of pain management programme interventions. The role of strategies aimed at increasing control over pain seems unclear, and needs further investigation in order to consider whether it should remain a key feature of such interventions.

There is growing recognition that the effects of pain management programmes are limited, that gains are modest (Van Tulder et. al., 2000) and that chronic pain is difficult even for those who appear to be coping well (Large & Strong, 1997). The suggestion that acceptance is low in this group, even after intervention, implies the need to provide some mechanism of longer term support for maintenance of change in a group who frequently continue to struggle with difficult symptoms and associated physical and psychological problems. This is reminiscent of debates in the mental health field concerning “revolving door” policies of service provision for people with long-term mental health problems, and calls to move towards systems providing longer-term support and intervention (Shepherd, 1995) to help people whose health problems cannot be cured to function as well as possible in society.

Interventions at the level of the patient or patient’s family may not be the only area where changes in practice are needed. Practitioners may need to consider the social and cultural context of expectations about disease and symptom control. Current

practice in many services may undermine acceptance through repeatedly offering interventions of unproven effectiveness aimed at relieving pain (Waddell, 1996). Interventions directed towards increasing patient acceptance by influencing the beliefs and practice of other health professionals in the field and the design of health care services need to be considered.

Finally, if changes in content and focus of pain management programme interventions are to be considered, it will also be important that clinical practice occurs within a research or evaluative context, so that the effects of such changes can inform debates about new directions in clinical practice more widely (Clegg, 1998).

#### **4.4 Implications for research**

The current study provides support for the relevance of the concept of acceptance of loss in adjustment to chronic pain. Evidence has been presented that suggests that acceptance of the losses associated with chronic pain increases during a pain management programme intervention and may be associated with improvements in psychological and physical function. In a previous study, McCracken (1998a) presented evidence that acceptance of pain, based on a definition of acceptance derived from behavioural theory, was associated with better psychological and physical function. Thus, concepts of acceptance, which have not been widely explored in the chronic pain field, appear to have considerable relevance to interventions designed to increase adjustment and improve function in this patient group.

However, it is argued that further work is needed to further investigate and establish the nature of acceptance in chronic pain. It is a concept which is in common lay use, but is more difficult to define in a way which lends itself to scientific investigation (Haas, 1994). McCracken's definition is derived from behavioural theory and closely allied to the concept that avoidance of painful activity contributes to chronicity (Vlaeyen & Linton, 2000). Dembo's definition derives from a sociological model of enquiry and is based on interview data with people who have experienced disability (Dembo, 1956). These very different conceptual foundations have contributed two aspects of acceptance, both of which seem to have relevance to the management of chronic pain. It would, therefore, seem useful to investigate the relationship between these two aspects of acceptance. This could be done by examining the relationship between performance on the two acceptance measures derived from these definitions. On the other hand, a broader, more exploratory investigation into the nature of acceptance, may yield a richer understanding of the nature of acceptance, and uncover further dimensions of the concept not elucidated by prevailing models.

It is suggested therefore, that qualitative studies are needed to gain a better understanding of the nature of acceptance in chronic pain. This work would need to acknowledge the reflexive nature of the meaning of acceptance. Acceptance may mean different things to people who are more or less accepting. In addition, different groups of people such as patients, patients' relatives, and professionals working with chronic pain patients may have different conceptualizations of acceptance. There is empirical support for this suggestion from a qualitative study into a different aspect of beliefs about pain. Eccleston, Williams & Rogers (1997) explored patients' and professionals' understanding of the causes of pain. The authors found that different



groups had widely divergent views on the causes of pain (e.g. lifestyle management versus deformities of the spine) with consequences for what kinds of treatment were seen as appropriate, notably self-management or medical intervention. These findings imply that different groups may have different views about the nature and value of accepting continuing pain. Studies exploring the nature of acceptance of pain may therefore need to gain the views of patients, significant others and professionals. They would also need to take into account the social and cultural context in modern Western society, in which health is highly valued and portrayed increasingly in the media as achievable through personal control (Dougher, 1994). This may make it more difficult to accept symptoms which cannot be controlled or eliminated (Radley, 1994).

This kind of exploration may assist in assessing the validity of existing measures of acceptance of pain and illness, and aid in the further refinement of these tools. Alternatively, they may suggest the need for the development of more complex, multidimensional measures of acceptance.

There is also a need for a better understanding of the interrelationship of dimensions of beliefs which have been identified as influencing physical and psychological functioning in people with chronic pain. There have been some recent studies which have investigated the relationship of factors such as coping, beliefs, negative thinking with physical and psychological function (Turner, Jensen & Romano, 2000, Stroud et. al., 2000). These have not, however, been based on a model of health beliefs as broad as that of Leventhal et. al. (1997). The application of this kind of model to the study of chronic pain could help in developing a better understanding of key

dimensions of beliefs which may influence functioning, and thereby inform clinical practice aimed at improving the physical and psychological welfare of chronic pain patients.

The role of control beliefs has been one of the most frequently investigated dimensions of belief in this field (Scharloo & Kaptein, 1997). Control beliefs themselves, however, appear to be complex and multidimensional and would benefit from further investigation. Again, qualitative approaches could be useful in exploring what patients and professionals mean when using the word control to describe cognitions and behaviour in chronic pain patients. Different meanings such as “avoid”, “regulate” or “manage” could have very different implications for functioning and need to be distinguished.

Further work is also needed to explore the best way of describing and measuring the range of relevant dimensions of belief in chronic pain. The Illness Perception Questionnaire is a promising tool, but it may need adaptation, taking into account previous work which has been undertaken into beliefs in chronic pain, and further validation with this patient group. For example, the concept of controlling pain by avoiding painful activity has been found to be an important factor affecting function (Asmundsen et. al., 1999). This aspect of control belief, however, is not explicitly included in the control/cure scale of the Illness Perception Questionnaire. The theoretical basis of this measure, nevertheless, is broader than that on which questionnaires concerning beliefs about pain have been devised within the cognitive-behavioural tradition, and as such, may help to develop understanding of the range and interplay of beliefs relevant to the experience and management of chronic pain.

Another area which would benefit from a new approach would be the investigation of who is likely to derive most benefit from pain management programme interventions. None of the independent variables measured in the current study predicted who would complete the intervention. There has been a failure to find consistent predictors of who will benefit from pain management programmes (Talo et. al., 1994). It has been suggested that there is a need for research aimed at gaining a better understanding of the underlying mechanisms of change on pain management programme interventions (Van Tulder et. al., 2000) in order to define which subgroups are most likely to benefit. It may be of value to adopt a qualitative approach, asking patients to discuss their reasons for not engaging, dropping out or completing this kind of intervention. This may help to generate further hypotheses, which could then be empirically tested. Another possible way of shedding light on this area would be to investigate whether experienced clinicians are able to intuitively predict who will benefit from the intervention. This could be fairly easily tested, and if clinicians' intuitions did have predictive value, the basis for these predictions could be explored using qualitative methods, and again used to generate further hypotheses concerning factors which may predict outcome.

#### **4.5 Conclusion**

The current study findings do not support the hypothesis that acceptance and cognitive representations of pain predict engagement and outcome of a pain management programme, but they do suggest that these factors are relevant to the process of change in this kind of intervention. Further work, however, is needed to

explore the nature of acceptance in chronic pain populations, and it's relationship with concepts of control. In addition, there is a need to identify the range and interplay of key dimensions of belief relevant to functioning and outcome of intervention in chronic pain populations. The majority of published studies of chronic pain are based on cognitive-behavioural theory, and research may benefit from considering the application of broader models, derived from work in the related fields of chronic illness and disability, to the study of chronic pain.

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**Appendix 1**

**Acceptance of Pain Scale 1**

(adapted from the Acceptance of Illness Scale, Felton & Revenson, 1984)

**Name:** .....

**Date:** .....

**Instructions**

Please respond to each of the following items by choosing a number from 1 to 5 on the scale adjacent to the item which you feel best describes you. Then **circle** the number you have chosen. there are no right answers to any of the questions.

**1. I have a hard time adjusting to the limitations of my pain.**

Strongly agree	1	2	3	4	5	Strongly disagree
----------------	---	---	---	---	---	-------------------

**2. Because of my pain, I miss the things I like to do best.**

Strongly agree	1	2	3	4	5	Strongly disagree
----------------	---	---	---	---	---	-------------------

**3. My pain makes me feel useless at times.**

Strongly agree	1	2	3	4	5	Strongly disagree
----------------	---	---	---	---	---	-------------------

**4. Pain makes me more dependent on others than I want to be.**

Strongly agree	1	2	3	4	5	Strongly disagree
----------------	---	---	---	---	---	-------------------

**5. My pain makes me a burden on my family and friends.**

Strongly agree	1	2	3	4	5	Strongly disagree
----------------	---	---	---	---	---	-------------------

**6. My pain does not make me feel inadequate.**

Strongly agree	1	2	3	4	5	Strongly disagree
----------------	---	---	---	---	---	-------------------

**7. I will never be self-sufficient enough to be happy.**

Strongly agree	1	2	3	4	5	Strongly disagree
-------------------	---	---	---	---	---	----------------------

**8. I think people are often uncomfortable around me because of my pain.**

Strongly agree	1	2	3	4	5	Strongly disagree
-------------------	---	---	---	---	---	----------------------

## Appendix 2

## Acceptance of Pain Scale 2

(adapted from Acceptance of Disability Scale: Li & Moore, 1998)

**Name:** .....

**Date:** .....

## Instructions

Please respond to each of the following items by choosing a number from 1 to 5 on the scale adjacent to the item which you feel best describes you. Then **circle** the number you have chosen. there are no right answers to any of the questions.

**1. My pain prevents me from doing things I want.**

Strongly agree	1	2	3	4	5	Strongly disagree
----------------	---	---	---	---	---	-------------------

**2. My pain affects those aspects of my life that I care most about.**

Strongly agree	1	2	3	4	5	Strongly disagree
----------------	---	---	---	---	---	-------------------

**3. A person who has pain is no different from anyone else.**

Strongly agree	1	2	3	4	5	Strongly disagree
----------------	---	---	---	---	---	-------------------

**4. My pain is so overwhelming to me that I cannot enjoy anything.**

Strongly agree	1	2	3	4	5	Strongly disagree
----------------	---	---	---	---	---	-------------------

**5. It is important to me to accept myself as I am.**

Strongly agree	1	2	3	4	5	Strongly disagree
----------------	---	---	---	---	---	-------------------

**6. I feel I am able to offer a lot to other people.**

Strongly agree	1	2	3	4	5	Strongly disagree
----------------	---	---	---	---	---	-------------------



**7. My pain has disrupted my life greatly.**

Strongly agree	1	2	3	4	5	Strongly disagree
----------------	---	---	---	---	---	-------------------

**8. My pain does not interfere with achieving what I want to do.**

Strongly agree	1	2	3	4	5	Strongly disagree
----------------	---	---	---	---	---	-------------------

**9. I feel O.K. talking about my pain with others.**

Strongly agree	1	2	3	4	5	Strongly disagree
----------------	---	---	---	---	---	-------------------

**10. A person with pain can enjoy many things in life.**

Strongly agree	1	2	3	4	5	Strongly disagree
----------------	---	---	---	---	---	-------------------

Appendix 3

PAIN PERCEPTION QUESTIONNAIRE

Name:.....

Date:.....

Pain identity

Please indicate by ticking the appropriate box how frequently you experience each of the following symptoms.

	All of the time	frequently	occasionally	never
pain				
nausea				
breathlessness				
weight loss				
fatigue				
stiff joints				
sore eyes				
headaches				
upset stomach				
sleep difficulties				
dizziness				
loss of strength				

We are interested in your own personal views of how you now see your pain. Please indicate how much you agree or disagree with the following statements about your pain by writing the appropriate number next to each statement as follows:-

4 strongly agree	3 agree	2 neither agree nor disagree	1 disagree	0 strongly disagree
---------------------	------------	---------------------------------	---------------	------------------------

For example, if you strongly agree with a statement you would write 4 next to the statement.

Cause

- A germ or virus caused my pain .....
- Diet played a major role in causing my pain .....
- Pollution of the environment caused my pain .....
- My pain is hereditary – it runs in my family .....
- It was just by chance that I got pain .....
- Stress was a major factor in causing my pain .....
- My pain is due to my own behaviour .....
- Other people played a large role in causing my pain .....
- My pain was caused by poor medical care in the past .....
- My state of mind played a major part in causing my pain .....

4 strongly agree	3 agree	2 neither agree nor disagree	1 disagree	0 strongly disagree
------------------------	------------	------------------------------------	---------------	---------------------------

**Time-line**

- My pain will last a short time .....
- My pain is likely to be permanent rather than temporary .....
- My pain will last for a long time .....

**Consequences**

- My pain is a serious condition .....
- My pain has had major consequences in my life .....
- My pain has become easier to live with .....
- My pain has not had much effect on my life .....
- My pain has strongly affected the way others see me .....
- My pain has serious economic and financial consequences .....
- My pain has strongly affected the way I see myself as a person .....

**Control / cure**

- My pain will improve in time .....
- There is a lot which I can do to control my symptoms .....
- There is very little that can be done to improve my pain .....
- My treatment will be effective in curing my pain .....
- Recovery from my pain is largely dependent on chance or fate .....
- What I do can determine whether my pain gets better or worse .....

HEALTH AUTHORITY

LOCAL RESEARCH ETHICS COMMITTEE

Tel:

Fax:

15 October 1999

Re: LREC No. 82/99

*[Please quote above reference in all correspondence]*

Ms. H. Rankin  
Chartered Clinical Psychologist


Dear Ms. Rankin,

re: **Do acceptance of pain and cognitive representations of pain predict  
engagement and outcome on a pain management programme?**

Thank you for your letter and enclosures of 7 October 1999. I am happy to give  
approval to this study on behalf of the LREC and wish you the best  
of luck with it.

With best wishes,

Yours sincerely,



Dr Hervey Wilcox  
Chairman  
Local Research Ethics Committee

---

All correspondence to:

The LREC Chairman,

## **Appendix 5.**

### **Patient Information Sheet**

Research project: beliefs about pain and progress on a pain management programme

#### **Introduction**

We are currently carrying out a research project within the pain management programme to find out more about what people believe about their pain. We are hoping to find out how this affects whether people wish to take part in the programme and how they get on during the programme itself. We hope that this research will give us a better understanding of who is likely to benefit most from the programme and how we may be able to help people who do not wish to take part in this kind of approach to pain management.

We are currently asking everyone who is seen at \*\*\*\*\* for assessment whether they would like to take part in this research.

#### **What would it involve?**

If you were willing to take part, you would be asked to complete two extra questionnaires at assessment, which should take about 10 to 20 minutes. If you take up the offer of a place on the programme we would ask you to complete the questionnaires twice more, at the beginning of the course and at the first follow-up appointment. The questionnaires ask you how much you agree with a number of statements about your pain.

#### **Will this affect your treatment?**

\*\*\*\*\* uses questionnaires regularly as part of the assessment procedure. The extra questionnaires you would complete as part of this research will not be used as part of this assessment and so will not affect decisions about your treatment in any way.

#### **How confidential will it be?**

The questionnaires will be collected by a member of the clinical team at \*\*\*\*\* . They will be kept separately from your clinical records and will not be available to anyone who is not involved in the research project. Your personal details will not be entered onto the computer used to analyse the results, in order to protect your confidentiality.

#### **What if I do not wish to carry on?**

You are free to withdraw from the study at any time without giving a reason and your future medical care will not be affected.

**Who is doing the research?**

The research is being carried out by Hilary Rankin, co-ordinator of the \*\*\*\*\* pain management programme and a chartered clinical psychologist with over ten years experience of working with people with long-term pain.

**What will happen next?**

Once you have read this sheet you will be given the opportunity to ask any questions you may have about the project by a member of the \*\*\*\*\* team whom you see as part of the assessment. If you are willing to take part in the project you will be asked to read carefully and sign a consent form. You will then be given the additional questionnaires to fill in.

Signed by the person in charge of the project:.....

Name: Hilary Rankin, Chartered clinical psychologist

Contact address and telephone number:

Date:.....

**Appendix 6**

**THE EPSOM AND ST. HELIER NHS TRUST**  
**Consent Form**

Title of project:

**Do acceptance of pain and cognitive representations of pain predict engagement and outcome on a pain management programme?**

Have you read the patient information sheet? YES/NO

Have you had an opportunity to ask questions and discuss the study? YES/NO

Have you received enough information about the study? YES/NO

Who have you spoken to? Dr/Mr/Ms .....

Do you understand that you are free to withdraw from the study:

- at any time throughout the study
- without having to give a reason for withdrawing

and without affecting your future medical care? YES/NO

Do you agree to take part in this study? YES/NO

Signed ..... Date .....

Name in block letters .....

Witnessed by .....

**Appendix 7**

**Pain management programme content outline**

**Session 1**

9.30 a.m.	Introduction to programme aims and content Participants introduce each other and team introduction
10.00 a.m.	Introduction to Pain Gate Theory
10.30 a.m.	Coffee break
10.45 a.m.	Seating
11.15 a.m.	Introduction to Exercise
11.45a.m.	Introduction to Stress and Relaxation  Diaphragmatic breathing

**Session 2**

	Check Time	Collect Pain Diaries Check exercises
9.30 a.m.	Activity Cycling	
9.50 a.m.	Pacing	
10.05 a.m.	Goal Setting	
10.20a.m	Coffee break	
10.35 a.m.	Practical goal setting	
11.15 a.m.	Drugs and Doctors	
11.45 a.m.	Deep Muscle Relaxation	



### **Session 3**

9.30 a.m.	Practical Medication Reduction Take in long-term goal sheets
10.00 a.m.	Exercise
10.30 a.m.	Coffee break
10.45 a.m.	Goal Setting in group
11.15 a.m.	Introduction to Thoughts and Feelings
11.45 a.m.	Deep Muscle Relaxation in vivo using large muscle groups

### **Session 4**

9.30 a.m.	Thoughts and Feelings (including feedback of diaries of thoughts and feelings)
10.30 a.m.	Coffee break
10 45 a.m.	Exercise
11.15 a.m.	Lifting and ADL
11.45 a.m.	Planning own goal setting - any problems
11.55 a.m.	Self-hypnosis

### **Session 5**

#### **Relatives present**

#### **Books out for browsing**

9.30 a.m.	Welcome to relatives. Format of morning. Books and Notice board.
9.40 a.m.	Understanding Pain
10.30 a.m.	Coffee break - set up Aromatherapy

10.50 a.m.	Goal Setting: expanding the theme
	Question / Answer time
11.30 a.m.	Aromatherapy

### **Session 6**

9.30 a.m.	Pain Behaviour & Communication (will include feedback from relative's session)
10.30 a.m.	Coffee break
10.45 a.m.	Sleeping and sex difficulties
11.15 a.m.	Positive self statements
11.45 a.m.	Autogenic relaxation

### **Session 7**

9.20 a.m.	Individual reviews
10.10 a.m.	Beds
10.30 a.m.	Coffee break
10.45 a.m.	Benefits of Health
11.15 a.m.	Benefits of Fitness
11.45 a.m.	Applying relaxation techniques
12.10 p.m.	What I have learned on the course - sheet explanation

### **Session 8**

- 9.30      Review of concepts learnt on course and set goals for next 4 weeks  
a.m.
- 10.45     Coffee break  
a.m.
- 11.00     Flare up plans  
a.m.
- 12.00     Discuss future G.P. appointments and pain management programme  
noon      follow-up sessions  
             Question time

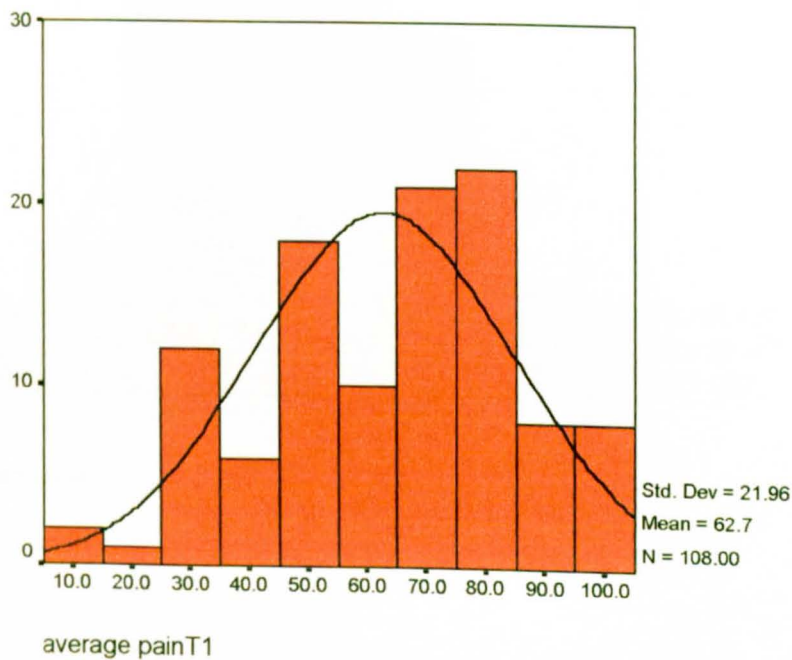
### **Session 9**

- 1.15 p.m. Individual review of medication use/plans. Reassessment of physical  
              and questionnaire measurements
- 1.45 p.m. Review of individual goals  
              Troubleshooting  
              Set goals for next 5 months

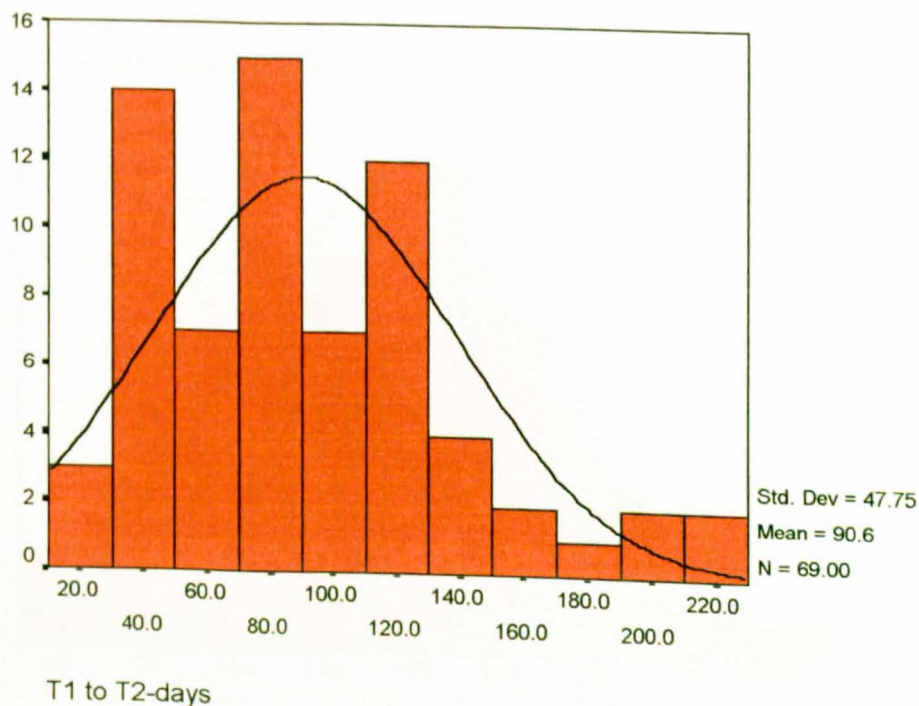
Appendix 8

Histograms of distribution of data for independent, dependent and confounding variables

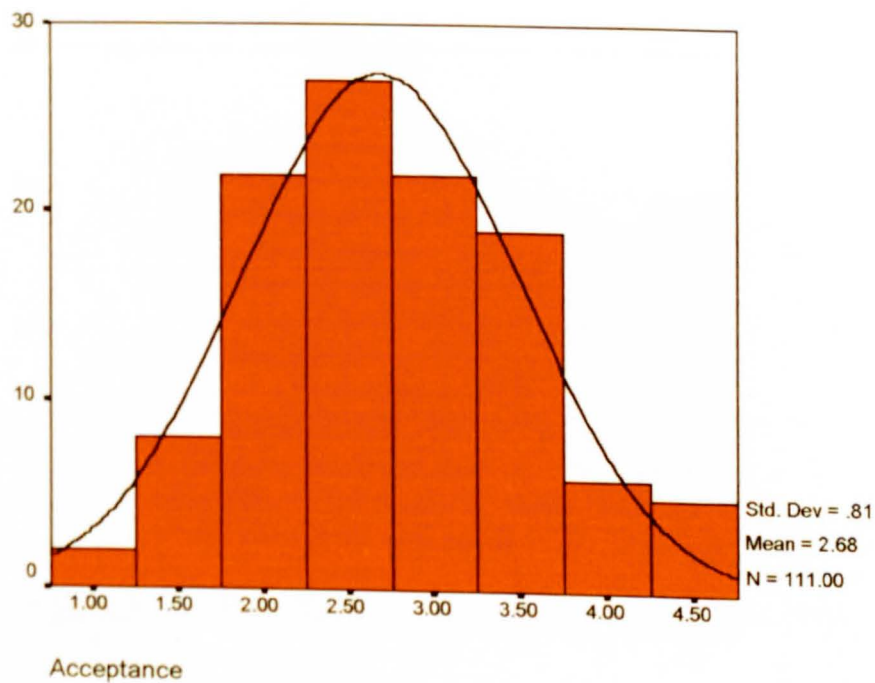
a) Average pain intensity at T1



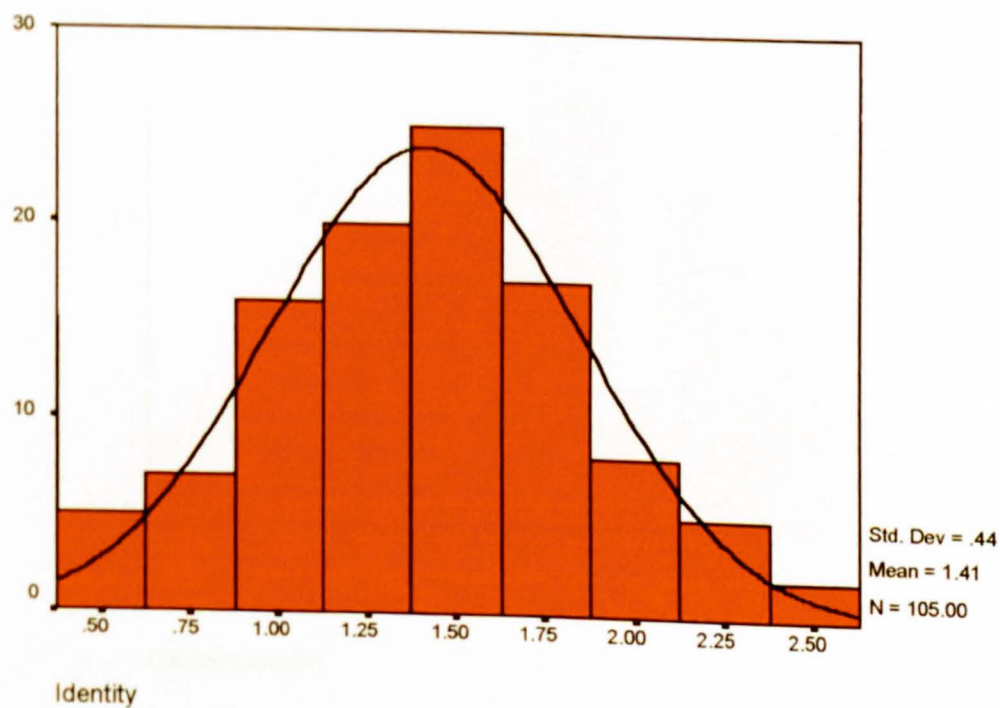
b) Time from assessment to start of intervention (T1-T2)



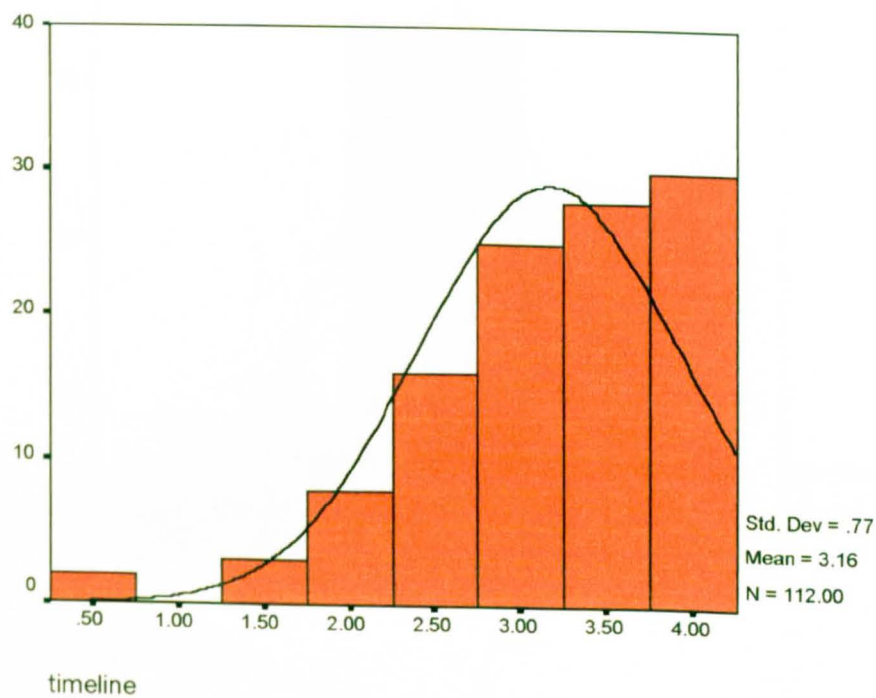
**c) Acceptance of Pain Score at T1**



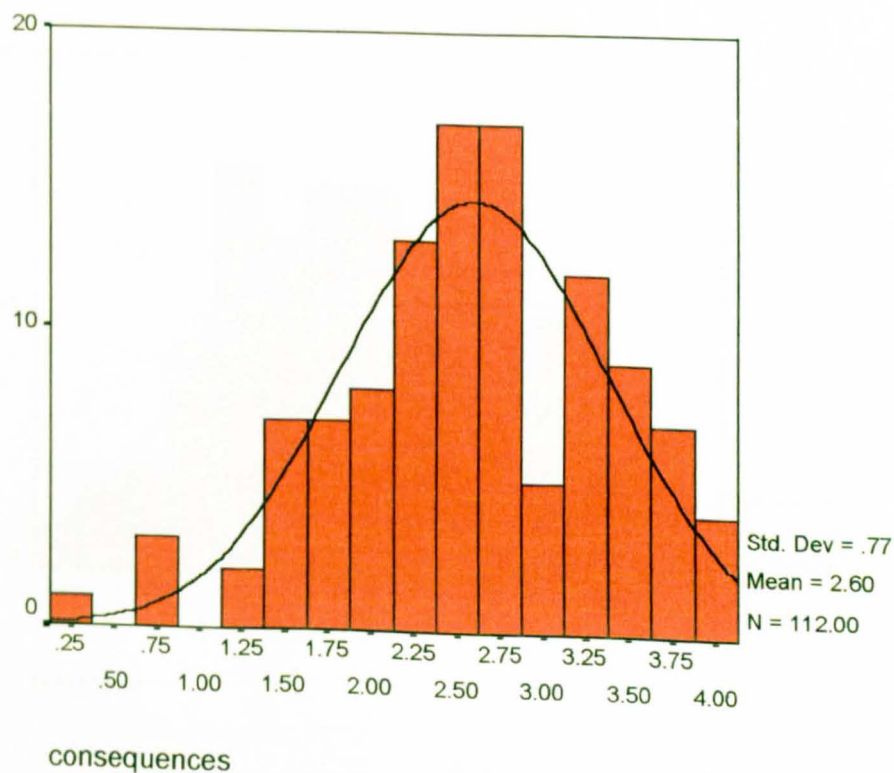
**d) Illness Perception Questionnaire- Identity score at T1**



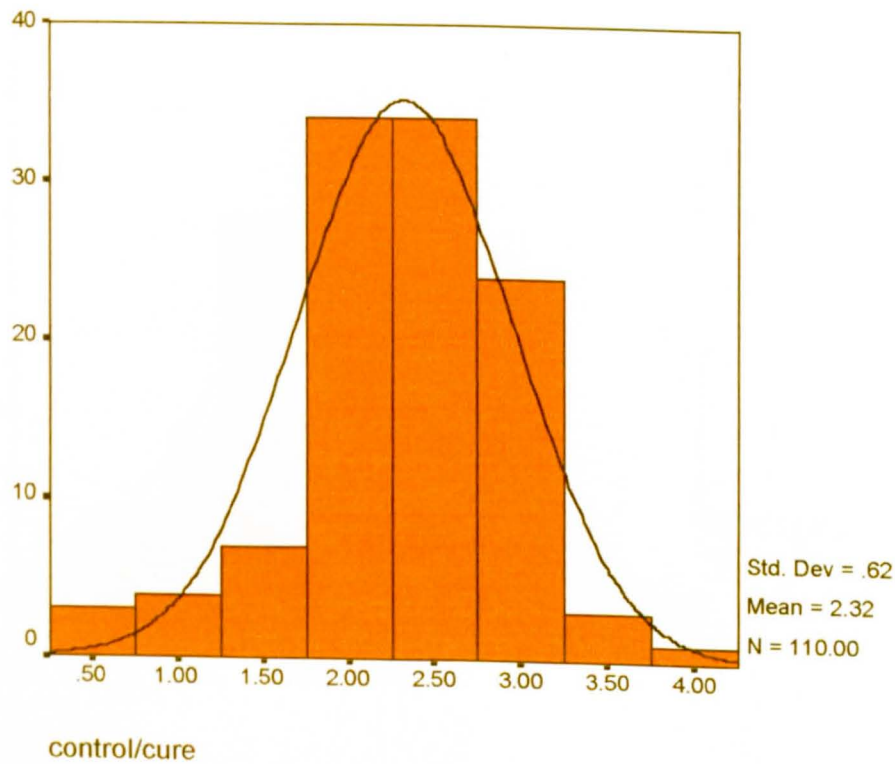
**e) Illness Perception Questionnaire- timeline score at T1**



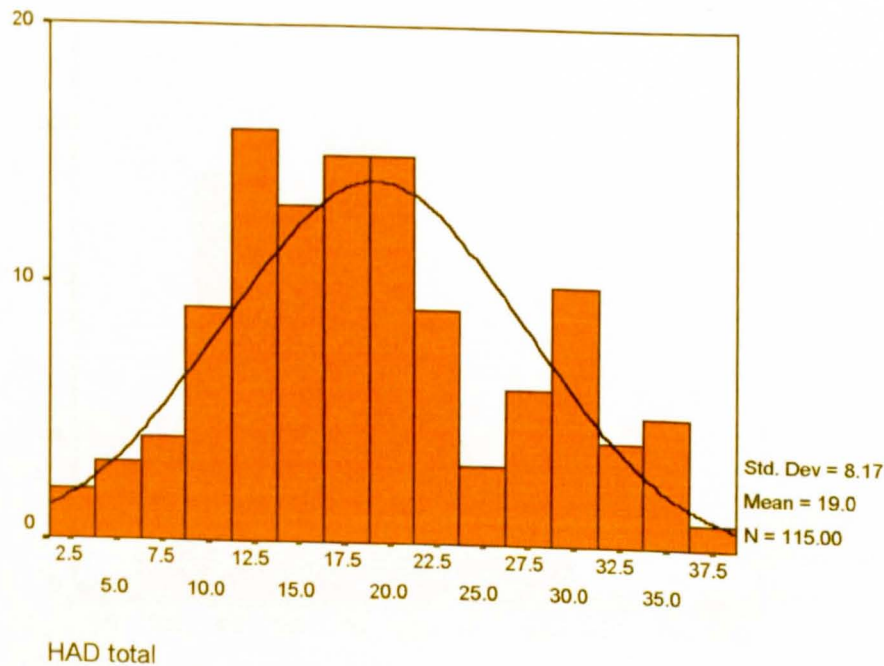
**f) Illness Perception Questionnaire- consequences scale**



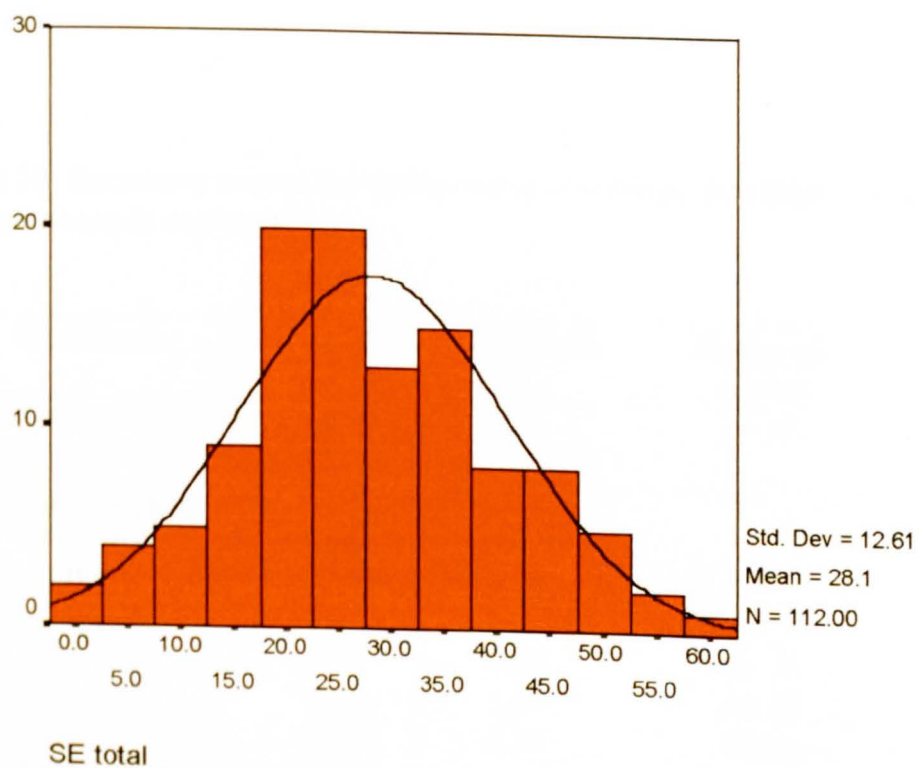
**g) Illness Perception Questionnaire- control/cure scale**



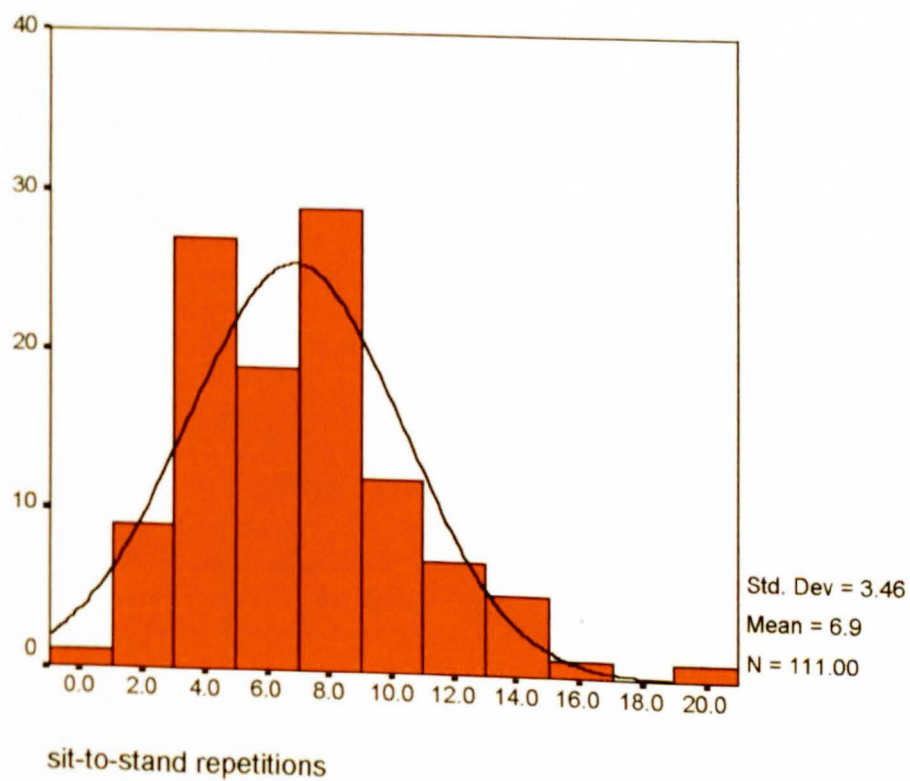
**h) Hospital Anxiety and Depression Scale whole scale score at T1**



i) Pain self-efficacy questionnaire score at T1



j) Sit-to-stand repetitions at T1





Appendix 9

Table 10. Summary scores for independent variables at initial assessment used in non-parametric analyses.

Scale/item	n	Mean score	Range of scores	Standard deviation
PPQ identity ( number of items endorsed)	105	9.35	4 - 12	2.04
<b><u>PPQ Cause scale items</u></b>				
Germ/virus	114	0.47	0 – 4 for all items	0.92
Diet	115	0.51		0.92
Pollution	114	0.49		0.92
Heredity	114	0.96		1.24
Chance	114	1.83		1.54
Stress	115	1.31		1.30
Own behaviour	115	1.09		1.23
Other people	113	1.13		1.48
Poor medical care	112	0.99		1.23
State of mind	112	0.81		1.07
<b><u>Control/cure scale items</u></b>				
Will improve in time	112	1.60	0 – 4 for all items	1.12
Lot I can do to control	113	2.35		0.91
Little can be done to improve	113	1.96		1.01
Treatment will be effective in curing	113	1.93		0.88
Recovery dependent on chance	112	1.10		1.09
What I do determines whether better or worse	112	2.82		1.02

**Appendix 10**

**Table 11: Results of between subjects analyses for values at initial assessment**

Measure	Mean score: Completed group	N : Completed group	Mean score: Did not complete group	N: Did not complete group	t	Sig. (2-tailed)
Acceptance	2.53	53	2.65	39	-0.74	p = 0.46
PPQ identity	1.43	51	1.45	37	-0.28	p = 0.78
PPQ timeline	3.23	53	3.12	40	1.10	p = 0.28
PPQ consequences	2.77	52	2.60	41	1.16	p = 0.27
PPQ control/ cure	2.34	52	2.24	39	0.86	p = 0.39
HADS	20.20	56	19.93	41	0.17	p = 0.87
PSEQ	26.00	53	27.48	40	-0.58	p = 0.57
Sit-to-stands	6.01	54	6.51	40	-0.82	p = 0.42
Pain severity	64.81	52	60.95	37	0.82	p = 0.43

Levene's test for equality of variance was conducted for all tests and did not reach significance at the 0.05 level for any of the comparisons made